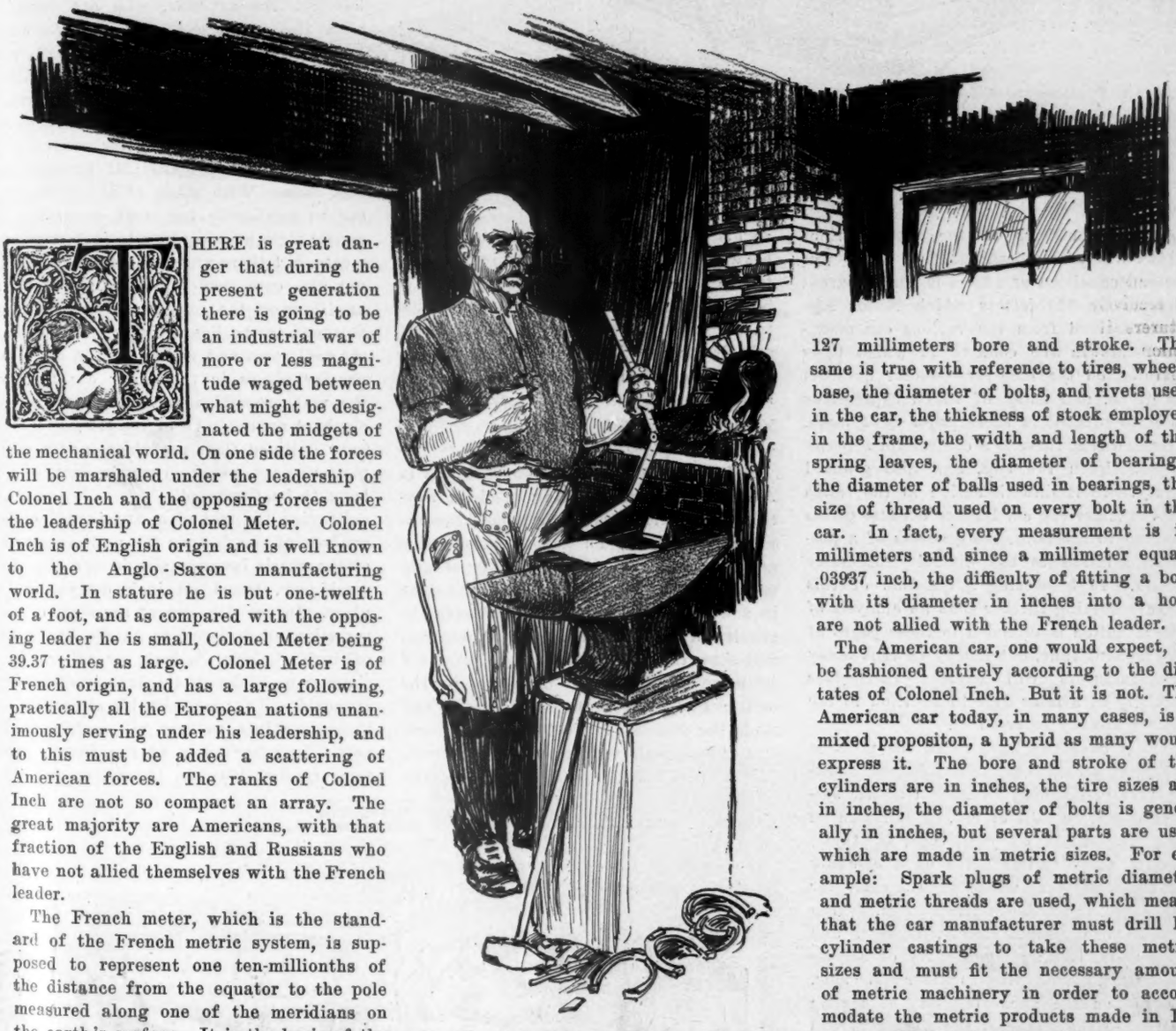
VOL. XVII, No. 14 CHICAGO, APRIL 7, 1910 $3.00 PER YEAR

MOTOR AGE

WAR OF MIDGETS, THE INCH AND THE METER



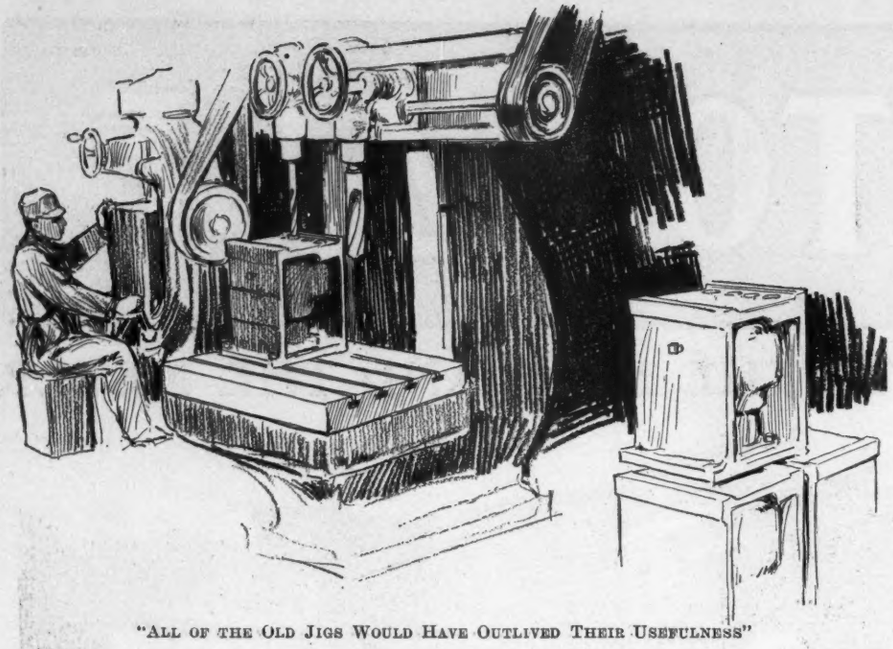
"IF HE ATTEMPTS TO HAVE A DUPLICATE MANUFACTURED BY THE VILLAGE BLACKSMITH WHOSE STOCK IS IN INCH SIZES, HE FINDS IT IMPOSSIBLE."

THERE is great danger that during the present generation there is going to be an industrial war of more or less magnitude waged between what might be designated the midgets of the mechanical world. On one side the forces will be marshaled under the leadership of Colonel Inch and the opposing forces under the leadership of Colonel Meter. Colonel Inch is of English origin and is well known to the Anglo-Saxon manufacturing world. In stature he is but one-twelfth of a foot, and as compared with the opposing leader he is small, Colonel Meter being 39.37 times as large. Colonel Meter is of French origin, and has a large following, practically all the European nations unanimously serving under his leadership, and to this must be added a scattering of American forces. The ranks of Colonel Inch are not so compact an array. The great majority are Americans, with that fraction of the English and Russians who have not allied themselves with the French leader.

The French meter, which is the standard of the French metric system, is supposed to represent one ten-millionths of the distance from the equator to the pole measured along one of the meridians on the earth's surface. It is the basis of the metric system, the meter, in brief, being but 3 inches more than the yard measurement. To be exact, the meter is 39.37 inches. In motor car construction it is the millimeter, however, which is the unit most employed in France, Germany, England, Italy, and other European countries. To be accurate, the millimeter is .03937 inch, or roughly speaking one-twenty-fifth inch in length. This is the unit of measurement that is solely employed on French and German cars, as well as those made in Italy, Belgium, and many manufactured in England. Speaking roughly, then, the European car is a metric car: The bore and stroke of the cylinders are given in millimeters and not in inches; instead of saying a cylinder has 5-inch bore and 5-inch stroke the European expresses it 127 millimeters bore and stroke. The same is true with reference to tires, wheelbase, the diameter of bolts, and rivets used in the car, the thickness of stock employed in the frame, the width and length of the spring leaves, the diameter of bearings, the diameter of balls used in bearings, the size of thread used on every bolt in the car. In fact, every measurement is in millimeters and since a millimeter equals .03937 inch, the difficulty of fitting a bolt with its diameter in inches into a hole are not allied with the French leader.

The American car, one would expect, to be fashioned entirely according to the dictates of Colonel Inch. But it is not. The American car today, in many cases, is a mixed propositon, a hybrid as many would express it. The bore and stroke of the cylinders are in inches, the tire sizes are in inches, the diameter of bolts is generally in inches, but several parts are used which are made in metric sizes. For example: Spark plugs of metric diameter and metric threads are used, which means that the car manufacturer must drill his cylinder castings to take these metric sizes and must fit the necessary amount of metric machinery in order to accommodate the metric products made in Europe, and which he fits on his car.

Some American cars are more metric than others. While it is true that some employ only metric sizes in the spark plugs, others use metric measurements for certain bolts, etc. The question naturally arises with this mixed condition of affairs where will the matter end, and when the struggle for supremacy between Colonels Inch and Meter terminate, and how? That there is a struggle is apparent from the fact that both are being used by



"All of the Old Jigs Would Have Outlived Their Usefulness"

American makers at the present time. That there is dissatisfaction with this mixed condition of affairs is also apparent by nearly 100 letters which Motor Age has received from the various car manufacturers in the country in which their opinion on the inch-versus-meter question is given, and many of which expressions will be printed in these pages next week. Granted that there is a contest for supremacy between the two, and also granted that there is dissatisfaction in the ranks of the American car builder because of his having to use both, the question of a possible solution to the difficulty naturally arises. In answering a question of this nature nothing further than an analysis of the situation is intended in these pages at the present time, but it may be that many manufacturers will express themselves publicly at a later date in addition to the letters already referred to.

Other countries have faced the problem which at present confronts America, namely, that of deciding whether a metric system should be used or not. Austria faced this proposition 35 years ago, or thereabouts, when it was acted upon officially by the legislature which gave 5 years for the adoption of the metric system, during which time manufacturers, dealers, and consumers, had an opportunity of accomplishing the transition to the metric side. As far as the anchoring on the metric system in the minds of the Austrians was concerned it required one generation, or approximately 35 years, to do the work. A generation of people who have been brought up to thinking in feet and inches cannot be led to think in millimeters and meters in a day or 2. This is a problem which can only be satisfactorily solved in the schoolroom. The child must be taught millimeters and meters, and not feet and inches. First impressions are lasting and the boy who gains first a conception of an inch or a foot and uses these as his standard of gauging distance, will have great difficulty in switching over to the meter as his unit of measurement. It is because of this that the real transition to the metric system must begin in the schoolroom and it can only begin in the schoolroom when the parliament of the land, the legislature, the congress, or whatever the controlling body is, says so, after which it will be taught in the school.

A few of the fanatical manufacturers in America, who see nothing good in anything else but the metric system, have expressed desire for an immediate adoption of the metric system and they apparently see no reason why this could not be done in a week. They have failed to grasp the gravity of the situation. A brief analysis will show their shortcomings. What would it mean to industrial America if the metric system were to be enforced and made the standard? To the manufacturer first this appeals with special significance. All of his working drawings are made according to inch measurements so that he would have to put on an additional force of draughtsmen to translate these drawings, converting them into millimeter measurement and having them as close as possible to the original inch sizes.

But this manufacturer's difficulties would not end with the draughting room. Every change in the draughting room is a forerunner of a change in the pattern shop. All of his patterns, which have been made according to inch sizes, must be junked and new ones based on the metric principle made. This means weeks of additional work, but if that manufacturer has not the artisans, who are familiar with the metric system, it means additional time because these artisans will work at lower pressure when wrestling with the system of measurements foreign to the ideas instilled in them in their school days. But the matter cannot stop with the pattern maker; it invades the tool room. With many of the tools they are as applicable for work according to metric sizes as according to inch measurements, but there are some in which this is not the case, and which would work a hardship on the manufacturer. Passing, however, to the jigs, which are products of the tool room and which are the most expensive pieces in the motor car factory, the real proportions of the metric white elephant appear. All of the old jigs would have outlived their usefulness and a complete new set, based on metric sizes, would have to be furnished.

Leaving the tool room and invading the confines of the factory the real magnitude of the metric invasion also is seen. Special machinery, based on inch design, is in place. In one department are rows of automatics, all designed to handle bar stock of inch, ½-inch, ⅝-inch, or other fractions or multiples of the inch in diameter. It would call for considerable alteration in these machines to turn out metric products. In other parts of the factory the same conflict between the meter and the

I BEEN IN THE HARDWARE BUSINESS MOST FIFTY YEARS BUT I NEVER HEARD OF THAT KIND OF A BOLT
I WANT A SEVEN MILLIMETER BOLT ABOUT SO LONG

"The Dealer in Dallas, Tex., Must Carry a Double Stock"

"THE MANUFACTURERS' DIFFICULTIES WOULD NOT END WITH THE DRAFTING ROOM."

inch would be everywhere confronted, and every time an engagement between these respective forces occurred there would be a consquent expenditure of money by the factory. The factory, not willing to stand this entire expense itself, would be compelled to in some wise add it to the price of the car so that in the end the consumer would pay for the change.

If we leave the factory, however, and go back one step in the manufacturing process of the motor car, we will find more difficulties confronting us in this matter of change from the inch to the meter as a standard of measurement. The investigator must go to the steel mill, where stock is made in round bars of inch or other sizes, because practically all of the bolts used in American manufacture, are fractions of the inch, or multiples of it in diameter. Consequently, if the metric system were to be adopted, these factories would have to discontinue making stock in such sizes and manufacture it only in millimeter diameters. What is true of stock or bolts, would also be true of stock for axles, side members of the frame and various other parts. The transition to the metric would, in short, mean nothing less than a revolution in the industrial world and America, like Austria, would discover that the business houses would have to be given 5 or 10 years at least in which the transition would be made and it would require one generation to work that change in the minds of the American public, so that they would think in millimeters, meters, and kilometers instead of inches, feet and miles.

Having thus briefly seen what a change from one system to another would mean, it is opportune, now, to show some of the inconveniences of the present American mixed system, in which inches and millimeters are used in the same construction. The inconvenience of this to a manufacturer has already been referred to, but this inconvenience extends much further. It reaches the realm of the dealer and the owner as well. The mixed system means that the dealer in Dallas, Tex., if he is in the motor trade, must carry a double stock, he must carry spark plugs in metric sizes and spark plugs in inch sizes. It costs money to carry double stocks. Where the dealer does not carry double stocks, the disadvantages of the mixed system come directly upon the owner. If he is in need of a metric part when in some small town he must wait until that metric part can be received from the manufacturer or some other point. If he attempts to have a duplicate manufactured the village blacksmith, whose stock is in inch sizes and whose machinery is designed for manufacturing products based on the inch, finds it impossible to supply the demand and no other course remains but to await the arrival of the desired part.

Before looking into the respective advantages and disadvantages of the metric and inch systems, the inconvenience that the present mixed system works on the tire manufacturer might be glanced at. In a survey of the tire field it is discovered that half a dozen or more of the American tire houses make tires in metric sizes and keep them regularly in stock in all of their branches. Of the remainder of the tire manufacturers some of them manufacture a few metric sizes and only supply them on order, whereas others keep a limited stock in their larger branches. One tire maker has had a rather uncertain voyage in the metric size ocean. Three years ago he manufactured several sizes, a little later he dropped several of these and at the present time he finds it imperative that he place a full line of metrics on the market. These few examples show the difficulties of the mixed measurement system in the tire field, which by the way has been brought about by the presence of the foreign car. The metric system does not, however, work such havoc in the tire field as it does in the straight car field, because a little license in tire sizes is allowable and many of the inch sizes are close enough to the metric sizes to permit of an interchange should such be necessary. At best it is poor business to have to carry in hand stock that is rarely called for and particularly is this the case with tires where age often means a deterioration of the original product.

There are many advantages to the metric system and also to the inch and naturally each has its disadvantages. With mathematicians prestige goes with the metric system. The metric system of measurement is comparable with our decimal system of currency, in fact they are identical. It takes ten mills to make a cent, 10 cents to make a dime, 10 dimes to make a dollar, etc. In the French or metric system the same rule of 10 is in vogue, which makes it particularly easy to make changes.

(To be continued.)

"THE CHILD MUST BE TAUGHT MILLIMETERS AND METERS AND NOT FEET AND INCHES."

CHICAGO TROPHY FOR THE NATIONAL TOUR

Motor Club's Offer of Emblem for Competition in Runabout Division Accepted by Chairman Butler of Contest Board of A. A. A.—Pathfinder Will Start From Cincinnati Monday

CHICAGO, April 2—An offer made today by the Chicago Motor Club to hang up a trophy for the runabout division of the annual national tour was accepted by Chairman S. M. Butler of the contest board of the American Automobile Association, who was the guest of honor at a luncheon tendered this noon by the directors of the Chicago Motor Club. Mr. Butler was passing through the city on his way to Los Angeles and took advantage of the opportunity to confer with the Chicagoans relative to the Glidden tour. He accomplished considerable in this direction, for in addition to accepting the trophy he also announced the Glidden rules and the proposed night stops on the run from Cincinnati to Chicago by a roundabout way which takes in Kentucky, Alabama, Tennessee, Texas, Oklahoma and Missouri, a distance of approximately 2,500 miles.

The motor club also pledged itself to prepare a grand reception for the Gliddenites when they finish the tour in Chicago and with this end in view negotiations now are under way with the Chicago Association of Commerce looking to securing the co-operation of that powerful body, which has a membership of 4,000, which includes nearly all the prominent business houses in the city. Walter Moody, manager of the association, was in attendance at the luncheon and spoke most enthusiastically on the proposition.

Night Stops Suggested

Following the luncheon Harry W. Ford, secretary of the Chalmers company, who was one of the guests, announced that the Glidden pathfinder will start from Cincinnati next Monday morning with Joe Gardham at the wheel, Dai Lewis the official scout, and one of Lazarnicks' men to take the pictures. As laid out at the present time, the following night stops are suggested:

Towns—	Miles
Lexington, Ky.	88
Nashville, Tenn.	205
Florence, Ala.	128
Memphis, Tenn.	165
Little Rock, Ark.	209
Texarkana, Ark.	172
Dallas, Tex.	230
Oklahoma City, Okla.	204
St. Joseph, Mo.	207
Des Moines, Iowa.	195
Davenport, Iowa.	200
Chicago, Ill.	200

The Sunday stops will be at Memphis, Tenn., and St. Joseph, Mo. There is some doubt as to whether 1 or 2 days will be used in negotiating the stretch between Dallas and Oklahoma City, but that matter has been left to the discretion of the pathfinding party. About the only change from the route first announced by Chairman Butler, is that the jump from Nashville to Memphis will be made by way of Florence instead of going over the mountains as was first planned.

Changes in the Rules

One of the most radical departures noticed on the new rules is the dropping of the toy tonneau division. There now are only two classes—one for touring cars, which will compete for the Glidden trophy, and the other for runabouts contesting for the Chicago trophy. This latter class is a broad one and takes in two and three-passenger roadsters, and the toy tonneau division. Another departure is the adoption of fixed penalties for repairs and adjustments. There also is a graded penalty for outside help in the making of these repairs, it costing just twice as much if a stop is made at a blacksmith shop, for instance, as it would if the work was done entirely by the crew of the car. This year an effort has been made to centralize adjustments and bring them under official supervision by ruling that carbureters can be adjudged only at night controls. Spark plugs can be changed only in night controls, while brakes can be adjudged only at two places on the tour—at Memphis and again at St. Joseph. Gasoline, oil and water cannot be taken on at any place but the noon and night controls, the committee in charge proposing to keep tab on fuel and oil consumption.

For the first time seals will be used on the Glidden, the ruling being that bonnets and coil boxes must be sealed, while the tools must be carried in a bag which also will carry a seal. Accessories will not be penalized. Another change over last year is that this time there will be a fixed running schedule of 16, 18 and 20 miles an hour. Last year these schedules varied in that if the running time was 7½ hours there was a difference of 10 minutes between classes; 15 minutes if between 7½ and 9 hours; and 20 minutes if over 9½ hours. The complete rules are as follows:

Rules governing the 1910 national reliability tour of the American Automobile Association for the Glidden and Chicago trophies.

The seventh annual reliability tour for the Glidden trophy for touring cars and the Chicago trophy for runabouts and miniature tonneaux will start at Cincinnati on June 15, 1910, and end at Chicago June 29, 1910, including Louisville, Nashville, Memphis, Little Rock, Texarkana, Dallas, Fort Worth, Oklahoma City, Wichita, Topeka, Atchison, St. Joseph, Des Moines, Cedar Rapids, Davenport, Rock Island and Moline.

TROPHY AWARDS

The trophy in each class shall be awarded to the entrant whose car completes the contest with the fewest number of points to its debit. See general rule 526.

In case of a tied score for the Glidden trophy or for the Chicago trophy, the trophy will not be awarded, but suitable medals will be issued to the cars so tied, certifying that they have qualified as winners, and their names shall be properly inscribed upon the respective trophies.

Cars completing the contest with 97 per cent of the winning score shall be awarded Glidden certificates setting forth in detail

the performance of the car on the road and its condition upon final examination. Rule 525.

Each entrant shall be a member of the A. A. A. or of an affiliated club.

Stock cars only shall be eligible to compete and shall be divided into two classes according to body equipment: 1—Touring car class; 2—runabout class, including runabouts, miniature tonneaux, surreys and double or single rumbles. Rule 403.

Any stock touring car, a complete description of which has been filed by the manufacturer with the contest board of the American Automobile Association, at least 30 days prior to the date of the tour, as provided in rule 32, shall be eligible to compete for the Glidden trophy.

Any stock runabout, miniature tonneau, surrey, double or single rumble, a complete description of which has been filed by the manufacturer with the contest board of the American Automobile Association at least 30 days prior to the date of the tour, as provided in rule 32, shall be eligible to compete for the Chicago trophy.

CAR EQUIPMENT

404—Each competing car shall be delivered into the custody of the promoter's technical committee for official examination before the start of the contest, at the date required by the committee, which shall be specified upon the entry blank to determine if it is a stock car and regularly equipped.

405—Each car must carry at all times during the contest its catalogued equipment of lamps, tools, tire tools, body, fenders, sod pan, running boards, muffler and body parts; and, in addition, may or may not use windshield, top, extra tires, baggage rack, lamp bumpers and supplementary tonneau seats.

406—Special mud aprons may be used in front of the radiator or bonnet screens between the side members of the frame, same to be attached before the start of the contest in a manner satisfactory to the technical committee.

407—Rubber bumpers for springs and rebound straps may be used without penalization for trouble with them.

408—Tire-inflating tanks of any nature may be used.

409—Cars are not permitted to use searchlights unless same are part of regular equipment, but may affix two ordinary gas or electric lights with generator or gas tank.

410—Covers over coil boxes on the dash, or wherever located, not permitted unless regularly provided.

411—Leather or other covers over magnetos not permitted unless supplied regularly with stock cars. This applies to any other part of mechanism as well.

412—Screenings or shields of any construction around carbureter not permitted unless regularly fitted to stock cars.

413—The cotter-pinning, or lock-nutting of nuts or riveting of bolts or studs, other than is regularly done on stock cars at the factory, not permitted.

414—The use of special springs or spring windings not permitted.

415—Shock absorbers will not be permitted unless listed under regular, optional or special equipment.

PASSENGER LOAD

416—A touring car shall carry four or more persons.

A miniature tonneau, surrey, a runabout shall carry two or more persons.

Passenger load in all body types must average 125 pounds per person or a like amount in ballast.

RESPONSIBILITY OF ENTRANTS

1—Each entrant by his signature to the entry blank shall agree that he is familiar with the rules, that he will abide thereby and accept the official records, and authorize the American Automobile Association to publish them in such manner as it shall determine.

2—Each entrant shall hold the American Automobile Association harmless and indemnify it against all loss or damage resulting directly or indirectly from or growing out of the operation, management or control of the car entered by him.

3—The American Automobile Association shall not be responsible for any damage that may be done to any car, its passengers or contents during the tour, nor for the theft of any car or any of its accessories or contents, the same being at all times subsequent to such entry, and until the close of the tour, at the risk in all respects of persons entering same.

RULES FOR 1910 GLIDDEN TOUR ANNOUNCED

Two Divisions Instead of Three This Year—All Bonnets and Coil Boxes Sealed—Fixed Penalties Adopted—Brake Adjust-Can Be Made Only Twice on the Trip—Probable Night Stops

4—Each entrant or his official representative shall be responsibie for the acts of passengers in his car.

5—Each competing car must be delivered into the custody of the committee before 9 o'clock on the morning of Monday, June 13, for official examination and to check the inventories of parts carried as hereinafter provided for.

6—Each entrant shall name an official representative for each of his entries, on or before June 1, 1910, failing which the driver of the car shall be considered the offcial representative. Rule 426.

7—The official representative of the entrant shall be subject to all rules and penalties prescribed for the entrant, and shall be considered as the entrant in fact. Rule 427.

ENTRIES

1—The time for receiving entries shall expire on June 1, 1910, at 12 o'clock midnight, at the office of S. M. Butler, chairman contest board, 437 Fifth avenue, New York. Each entry must be accompanied by the entrance fee. Rule 432.

2—Each entrant shall give all details asked for in the entry blank and such additional information as the contest committee may from time to time require.

3—The contest committee of the American Automobile Association reserves the right to refuse any entry.

4—Entries shall be numbered in the order of their receipt. Rule 428.

428—Upon making an entry, each entrant shall appoint one observer for each car entered. See rule 465.

429—No more than three cars of any one make may be entered in either of the body equipment classes provided in rule 403.

430—The entry fee will not be refunded in case a car fails to start or is disqualified during the contest, or in any case, unless the contest is for any reason abandoned.

433—Any attempt at fraud in the evasion of the stock car definition or status of the car on the part of an entrant shall disqualify the car, the driver and the entrant.

TOOLS

417—All tools for the car will be carried in a special tool bag furnished by the promoter, which shall be sealed and handed over to the observer, and the use of tools other than those carried in the bag is prohibited. The number of tools is not limited to the supply sold with the car. When tools are needed the driver or mechanic will obtain them from the observer, who will keep a strict account of the number of tools used and see that they are returned to him at completion of work. Tire tools may be carried in the regular tool compartment of the car, but must not be placed in the official tool bag.

INVENTORY OF PARTS

418—Each entrant shall furnish prior to the start an inventory of all parts carried in his car, and these shall be officially checked, sealed and a record made of same.

TIRES

419—Each entrant may carry as many tires, demountable rims and tire chains and the parts which secure them in place as desired or purchase or obtain them en route without penalty.

TIRE REPAIRS

420—There shall be no penalty for tire repairs, provided the engine be kept running while the repairs are being made and no other work is done. The time consumed in making the repairs, while the engine is running, shall be added to the day's running time.

420A—The rule applied to tire repairs also applies to removal repairs, also anti-skid.

LUBRICATION EQUIPMENT

423—No additional lubrication equipment, such as pumps for forcing oil direct into crank case, will be allowed, unless cars are regularly sold with such equipment.

THE ROUTE

434—The route shall be exactly marked by one or more of the following methods:

A—By throwing confetti on the right side of the road 100 yards before the 100 yards after any turn. On long stretches, without turns, occasional throwings, especially at points 100 yards after passing any corner where a turn has not been made.

B—By providing each contestant with a description of the route, giving explicit directions of all right and left turns and right and left forks, and with occasional references to some conspicuous object. Mileage distance shall be placed to the left of each of these points noted in the route descriptions.

C—By marking the course with arrows and disks, the arrows to be placed 100 yards before a turn and the disks 100 yards after a turn. Disks shall also be placed 100 yards after passing any corner where a turn has been made.

PRELIMINARY INSPECTION

435—Contesting cars shall be given a preliminary inspection preceding the start of the contest. At this inspection one representative of the entrant will be present with the technical committee of the promoter. An inspection card showing the condition of wheels, springs, frame, front and rear axles, steering pivots, steering gear, body, motor, ignition parts, lubricating parts, cooling parts, carburation parts, exhaust parts, clutch parts, transmission and control parts, brakes and brake-operating parts, etc., will be filled out and any noticeable points about each that might later occasion dispute, recorded. This card must be attested by the entrant's representative.

SEALS

436—Metal and wire seals will be affixed by the technical committee as follows:

Gasoline Cars—Bonnet, coil box, transmission case, differential case, mud pan or apron and parts of ignition not beneath bonnet or protected by bonnet seals, and any other parts at the option of the promoter's technical committee. Where motors are under the body of the car, the floor, seat and deck boards must be suitably sealed.

437—Steam Cars—Bonnet, mud pan or apron, pilot light, theremostat, flow motor regulator and parts of steam system not beneath the bonnet and not protected by bonnet seals, and any other parts at the option of the promoter's technical committee.

438—A seal broken in the day will be replaced the evening of that day at the garage by the promoter's technical committee.

439—Breaking Seal—There will be no penalty for breaking a seal.

440—Lubrication—At the completion of each day's run—except the final day—after the cars are garaged, ½ hour will be given each contestant for lubricating all parts of the car, such as crank-cases, filling and turning of grease cups, motor, transmissions and other parts. This will be done under the supervision of the observer and a member of the promoter's technical or contest committee. Seals will be broken to permit of properly lubricating the car during this 30 minutes.

DRIVERS

441—Drivers may be changed as often as desired, but report of same is required to be made to the referee and the regular and substitute drivers shall be named in the entry blank. In case of illness, emergency drivers may be used. Drivers shall report at the official garage or park ½ hour before the announced starting time for the day and they, together with the observers, will be placed in charge of cars, whereupon they will immediately proceed to the starting line and take their proper places ready for the start. Drivers must not rely upon information obtained from the observers as to the route to be followed or as to any question regarding penalties.

OFFICIAL HEADQUARTERS

442—There shall be an official headquarters where all announcements must be posted on a bulletin board before and after a contest.

443—Before the start of any contest, all drivers, observers and entrants shall attend a meeting held for the purpose of instruction as to the intent of these rules. This meeting shall be in charge of the referee.

444—When the contest exceeds 1 day in duration an official bulletin board shall be displayed at a known headquarters each night, giving such additional information as may be required. Failure on the part of drivers, observers or entrants to attend the meeting of instruction and to consult the official bulletin board displayed at the headquarters shall be at their risk.

START

445—The time of starting shall be announced by posting on the bulletin board, or otherwise, the evening previous to each day's start. Cars will be started each morning at the hour announced the evening previous, the different cars starting at 1 minute intervals.

446—Cars shall start in the order of their presentation at the starting line and without regard to classes or divisions.

OFFICIAL NUMBERS

447—Each car shall have its official number prominently displayed on each side of the hood, painted on the radiator in front, and if possible, on the rear of body.

448—The name of the car in letters 4 inches high may appear upon the sides and upon the front and rear.

PACEMAKER

449—Each day's contest shall be preceded by a pacemaker; and by any entrant or representative thereof who passes the pacemaker shall be disqualified. The referee shall go with the tour in the pacemaker's car in order that he may be accessible to contestants at the end of each day's run. If the pacemaker's car breaks down or is compelled to travel at a rate of speed so slow as to impede the progress of the tour, his flag shall be transferred to the first suitable car overtaking him, which car shall thereafter become the pacemaker's car, subject to the same conditions, until such time as the official pacemaking car can again perform the duties.

CLASS A AND DIVISIONS

Competing cars shall be divided into the seven divisions of class A, as follows: Rule 400.

Division 1A	$ 800	and	under
Division 2A	801	to	$1,200
Division 3A	1,201	to	1,600
Division 4A	1,601	to	2,000
Division 5A	2,001	to	3,000
Division 6A	3,001	to	4,000
Division 7A	4,001	and	over

DAILY RUNNING TIME

450—The following average speeds shall be maintained by the cars in the respective divisions of class A:

Divisions 4, 5, 6 and 7.....20 miles per hour
Divisions 2 and 3.....18 miles per hour
Division 1.....16 miles per hour

451—All cars to avoid penalty will arrive at checking stations as per their schedule, plus additions, if any, to the running time for delays on account of tire troubles. Rule 420.

452—The referee may, if the necessities of the weather or road conditions demand, vary the speed schedules, announcement of any change being made by the starter previous to the start of the day's run to which the change shall apply, or during a day's run at any checking station by the checker at the designated station where the change is made, due notice being given to all contestants who shall acknowledge receipt of such notice by signing the checker's card.

CONTROLS

453—The official station established at the end of each day's run where the cars are officially checked, shall be known as the night control. The official stop for luncheon on each day's run—if there be one—where cars are checked in and out shall be known as the noon control.

454—Each contestant shall be ready each morning to check out at the time announced. Checkers shall be at their stations at that time prepared to start the cars. The time of departure each day shall be entered on the observer's card.

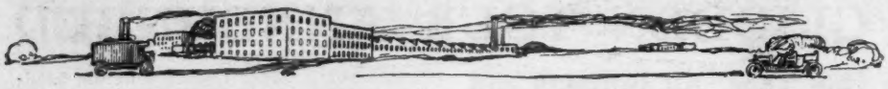
455—Each entrant, or official representative of such entrant, upon starting each day's run, shall sign a statement submitted by an official of the contest fixing the time of his departure, and shall be given a card indicating such time, which card shall bear the signature of said official. Failure to comply shall result in disqualification.

456—Controls and checking stations will be indicated by a flag with a white field and diagonal bar of red.

457—The referee may establish such checking points as he may deem proper. Each car shall be checked upon passing the established checking points and if ahead of time at the noon or night controls may immediately check in.

458—No car will be checked either in or out without its observer.

459—There shall be established at the close of each day's run a parking station, in which all competing cars shall be stored. The station shall be in charge of an official representative of the promoter's technical committee.



460—No work may be done on the cars while in the official garage or parking station, except lubrication during the ½ hour allowed at the end of each day's run. See Rule 404.

461—Following the registration at each night control, each car shall be delivered into the custody of the officials of the tour at the official garage or parking station to be by them held at the owner's risk, and kept under direct charge and supervision of such officials or their agents until the time for starting on the following morning. Immediately after registration at night controls and before delivery to the official garage or parking station, the car may deliver the occupants—other than the driver and observer—and baggage at hotel and then must immediately proceed to the parking station. The observer must not leave the car until it is parked.

462—Passengers and baggage may be taken on at the parking station after the car has been delivered to the driver and observer but before checking out in the morning, or at the hotel after checking out when no time shall be allowed.

INTERMEDIATE CHECKING

463—Checking stations shall be established in so far as may be necessary to stop speeding. Each driver shall receive a card when checking out in the morning which shall name the checking stations and the time the car is due at each station, so that he may estimate his running time during the entire day. There shall be no appeal from the time registered by the official watches; drivers and observers shall be required to rectify their watches each morning with the official time.

464—Cars cannot check in ahead of time, except at the noon and night controls.

OBSERVERS

465—Each entrant shall furnish at his own expense one official observer for each car entered by him. All observers shall be acceptable to and subject to the instructions of the promoter.

466—The entrant must arrange for the care and keep of his drivers and observers and pay any expenses connected therewith. He must also carry during the contest the baggage of each observer furnished by him.

467—If the entrant is a motor car manufacturer or dealer, or in any way connected with the manufacture or sale of motor cars, each observer furnished by him shall be:

A—A person who has been regularly and exclusively employed by the entrant by whom he is nominated for a period of not less than 3 months immediately prior to the contest, or

B—The entrant himself or an officer or director of his business, or

C—A dealer in the car made by the entrant, or

D—An owner of a car made by the entrant.

468—If the entrant is not a motor car manufacturer or dealer, the observer furnished by him shall be satisfactory to the promoter.

469—Each observer shall be assigned to a car and shall ride each day in a different car and no person shall serve as an observer on any car in which he has any direct or indirect pecuniary interest.

470—Observers shall report each morning at the official garage or park ½ hour before the announced starting time for the day, and take charge of the cars to which they have been assigned.

471—Each observer will be responsible for the tools of each car, as per rule 417.

472—Each observer must note the length of time in minutes and fractions of each stop made; if the motor is stopped or if any work is done, and also record what work was done on the car during the stop, how many persons were working, tools used and how long each person was working. See rules 485 and 521.

473—In case of breaking a seal, the observer will note the seal broken and must report how many times thereafter access was had to the part or parts protected by the said seal.

474—The observer must see that the running card is stamped or marked by the checker at each control or checking station and that his car does not pass a control or checking station before the time marked upon the running card, except at the noon and night controls, and also that the route is followed.

475—The referee shall be empowered to suspend any observer who neglects, is incompetent, or for any other reason fails to fulfill the duties assigned to him, and to provide a suitable substitute at the expense of the entrant by whom the suspended observer was nominated.

476—It shall be the duty of each observer under all conditions and without evasion of this rule for any reason whatsoever to remain with the car until he has been relieved by the chief observer or obtained the driver's signature to a statement that he has withdrawn from the contest and to report every detail of the performance of the car to which he is assigned, and all persons who operate, repair, assist or perform any action connected therewith.

477—If an official observer shall desert a disabled car without first obtaining the driver's signature to a statement that he has withdrawn from the contest, the entrant who appointed such observer shall be disqualified and must either withdraw from the contest altogether or continue as a non-contestant. By desertion is meant leaving the car without taking with him the driver and passengers. This rule will disqualify but one of the cars of an entrant in case of multiplicity of entries.

478—In addition to the surveillance of the cars in which they are riding, observers shall be required in so far as possible to make note of any other car which may be laid up alongside the road and whether the work being done upon it appears to be done on the tires or on the machinery and on what part of the car.

479—At the end of the day's run, the observer must remain with the car throughout the ½ hour allowed the driver in which to oil his car, rule 440, and when this is done, leave the car at the same time and in company with the driver—and deliver to the chairman of the technical committee or his delegated representative the running card, after obtaining the signature of the driver upon said card and signing same himself. The driver shall in no case be permitted to return to a car without the observer.

480—Should any objection be made by the driver to the record, a report may be immediately made to the chief observer and by him it may be referred if necessary to the referee for settlement. In the event of a dispute as to facts the referee may require the driver to state his objection in writing. The record may also be inspected by any other properly authorized representative of the entrant, who shall also have a right to register an objection and submit proof in support thereof.

481—At a checking station, or at any regular stop, should the observer wish to leave the car he must not do so until relieved by some official of the contest, who, at the same time, must appoint a relief observer, who shall remain with the said car until the regular observer returns to it. After he returns to the car, the regular observer must receive a report, orally or otherwise, from the relief observer as to whether anything was done on the car during his absence.

482—Observers must not interpret rules for entrants or drivers and cannot say what work may or may not be done without danger of penalization, their duties being solely to record what is done and the exact length of time consumed in doing it.

483—In case of a tire repair when the engine is running the observer shall sign and hand to the driver a printed form on which is filled in the time consumed and see that the time is added to the running time, as provided for in rule 420.

484—In the event of sickness or an accident to an observer, which shall make it an impossibility for him to remain with the car, or secure a substitute properly authorized, he shall select one of the passengers of the car as a substitute observer, who shall perform all of the duties pertaining to the position, and shall, in addition thereto, have his record signed by all the occupants of the car during the time he is on duty.

485—When any work whether under penalty or non-penalty conditions is being done on different parts of the car, making it impossible for the observer to properly watch each operation, the observer may compel one of the workmen to stop until such time as he can properly watch him.

ROAD REGULATIONS

486—Entrants and official representatives of entrants shall conform to all laws, ordinances and rules of the road, and any entrant or official representative of such entrant violating any of the provisions of these rules, or who shall fail to show due consideration to the officials or other participants in the tour, or other users of the highways, may be disqualified or penalized, at the discretion of the referee.

487—Any car whose owner or driver shall be arrested for a violation of speed laws, or of any law or ordinance, may be disqualified or penalized, at the discretion of the referee.

488—When road conditions are so bad that a car cannot get sufficient traction to move, or is ditched, and reasonable effort has been made to extricate it, towing or other external means may be used to relieve the immediate distress only, but under no circumstances shall a car enter a night or any other control except under its own power. During such work of extrication the passengers need not necessarily remain in the car and may assist in the work. When towing or assistance from any external source shall have been received by a car its observer shall make a full and complete report to the referee, giving time, place, conditions, distance of tow and any other details. The sense of this rule is not to permit the towing of a car for any considerable distance.

489—All replacements, adjustments and repairs shall be done only during the daily running time.

490—The pacemaking car shall precede the contestants not less than 15 minutes ahead of the first car and with instructions not to exceed the running time of division 7 between any two checking stations. Where local conditions are factors, modifications of this rule may be made by the referee, due notice of same being given to contestants.

491—Contesting cars must not pass the pacemaking car unless it is running behind its schedule. Should a contesting car pass the pacemaking car it takes the pacemaker and his flag and must set a pace not in advance of that which the pacemaking car should have set.

492—Should the contesting car fail to maintain the proper pacemaking pace, it must surrender the pacemaker's flag to the next car that is suitable to take up the pace.

493—The pacemaker's flag shall be a navy blue field.

494—Cars unintentionally leaving the course must return to it at the point whence they left, under penalty of disqualification.

495—Cars intentionally leaving the course to make repairs may be disqualified, at the discretion of the referee.

NON-PENALTY ALLOWANCES

496—At noon or night controls, tanks for lubricating oil, gasoline and water may be filled without penalty.

497—For replenishments of oil, gasoline or water at any other places the penalty is 3 points for each occurrence.

498—Oil or grease may be added to or may be drawn off the various cases when necessary without penalty during the half hour allowed for oiling at the end of each day's run. Rule 440.

499—Recharging of batteries will be allowed at any time, but all work in connection therewith must be done in the presence of the observer.

499A—Brakes may be adjusted without penalty at Memphis, Tenn., and St. Joseph, Mo., under official observation.

499B—Carbureters may be adjusted for air or gasoline at night controls during ½ hour.

499C—Spark plugs may be charged without penalty at night controls during ½ hour allowed for oiling.

TIRES

See rules 419 and 420.

PROTESTS AND DISQUALIFICATION

500—A written protest may be filed with the referee by any participant in the tour, but must be accompanied by the sum of $25. If the protest is not sustained, this sum will be forfeited to the contest board; but if the protest is sustained the protest fee will be returned to the person making such deposit. No protest not conforming to the above requirements will be considered. Each protest will be acted upon at the earliest practicable moment.

A—Any protests as to unfair rulings, foul driving, routes, etc., shall be made within 12 hours after the occurrence.

B—Any other protests may be made during the tour or within 24 hours after the tour is concluded and before any award is made.

501—No entrant or his official representative shall be disqualified until he shall have been notified of the act complained of, and if the act be denied, he shall be given a hearing, after which a decision shall be rendered. Upon notice of disqualification, the referee may compel him to cease to run in the contest and in that event the official numbers shall be removed from his car, and such entrant shall not receive any certificate, but shall be mentioned in the records as having been disqualified, and no entrant of any car that may be disqualified shall have any claim of any kind or nature whatsoever against the promoter or against the American Automobile Association or any members of any committee or any official of the contest, because of such disqualification,

or the publication thereof, or failure to mention the performance of the disqualified car prior to its disqualification.

FINAL OUTDOOR OPERATIVE TESTS

502—The following tests are imperative at the completion of the contest in grades 1 and 2:

503—Brake Test—The car under test approaches a line across the roadway at its competing speed in the contest, one set of brakes is applied and the distance measured in which the car comes to a stop. The other set of brakes are similarly tested.

A perfect brake stops the car in 50 feet or under; a penalty of one point per foot or fraction thereof is imposed for distances above 50 feet.

504—Clutch Test—The front wheels of the car are rested against a vertical 8-inch curb, the low gear is engaged and the clutch let in. Failure to spin rear wheels, stall the motor or climb curb would be a bad clutch, for which a penalty of 5 points is imposed.

505—Transmission Test—Car must be driven on all different forward speeds and reverse. Failure to drive on any one speed incurs a penalty of 25 points.

506—Motor Tests—A—Gasoline cars, driving with open and closed throttle and advanced and normal spark to test firing. Penalty of 5 points is imposed for each cylinder not firing.

B—Steam Cars—Test to see if motor runs with open and closed throttle; if valve slide action is operative; if running temperature and pressure of steam are possible; if engine simples or compounds; and note if various gauges and controls are operating properly. Penalizations are per penalty schedule.

507—Penalization of Accessories—Speedometers, odometers, lamps, horn, clocks, storm fronts, tops and other accessories shall, at the option of the promoter, be penalized for work done upon them and for breaks and lost parts at final examination, which penalties will not count against the car, but against the accessories carried.

PENALTIES

508—All cars shall start with a clean score.

Any car which for any reason discontinues as a contestant shall be penalized 1,000 points in addition to all previous penalizations.

509—Time—At all controls or checking stations a car is given a 3-minute leeway. If due at a station at 10 o'clock, it has until 10:03 to arrive. The head checker must call aloud, or otherwise announce the time, so that waiting contestants can check through during their proper 3-minute leeway.

510—Cars cannot check in ahead of the time marked on the running card, except at the noon and night controls, under penalty of disqualification.

511—After the expiration of the 3-minute leeway, each arrival shall be penalized 1 point for each minute or fraction thereof. See rule 451.

512—Work—In penalizing for work done on a car, by its driver or passengers, a penalty of one point per man per minute, or fraction thereof, shall be imposed.

513—Penalty for Outside Work—Where work is done on a car by anyone other than the driver or passengers, the penalty will be 2 points per man per minute, or fraction thereof, for each of such outside persons.

514—Work in Running Time—Work must not be done on a car between the time it leaves the official garage and crosses the starting line and between the time it crosses the finishing line and enters the garage at the end of the day's run.

515—Replacement—A—Where a replacement is made by the driver or passengers, the penalization is 2 points per man per minute or fraction thereof.

B—Where a replacement is made by workmen other than the driver or passengers, the penalization is 4 points per man per minute or fraction thereof.

FINAL EXAMINATION PENALTY

516—At the close of the contest, each competing car, after being properly washed, shall be delivered to the technical committee, who shall record all adjustments, replacements or repairs necessary to place each car in a safe and satisfactory condition, and penalties therefor shall be imposed in accordance with the following fixed penalty schedule:

Parts of cars not enumerated in the schedule, which are discovered to be faulty, impaired, lost or loose, shall be penalized in due proportion to those therein enumerated.

FIXED PENALTY SCHEDULE

Lubrication—	
Broken oil feed	3
Inoperative oil feed	3
Leaky oil connection	1
Loose oiler	3
Disabled oiler	20
Lost grease cup	2
Loose grease cup	1

Carburation—	
Broken gasoline line	2
Leaky gasoline line	1
Leaky gasoline tank	1
Leaky gasoline petcock	1
Disabled throttle control	15
Broken or loose manifold	15
Brakes—	
Broken operating devices	100
Broken brake	100
Loose operating devices	25
Running Gear—	
Broken spring leaves, each	5
Broken spring clips, each	15
Broken spring seating	15
Loose spring clip	1
Loose spring horn	15
Broken frame side member	500
Broken frame cross member	150
Bent frame pieces	75
Broken strut rods	25
Broken torsion rod	25
Lost muffler	5
Broken muffler	3
Loose muffler	2
Broken wheel	100
Loose wheel spoke	5
Broken wheel spoke	10
Broken running board	6
Broken fender iron	6
Broken fender	5
Loose fender	2
Lost mud apron	8
Broken mud apron	5
Broken rear axle	300
Cooling—	
Leaky water connection	1
Leaky radiator	20
Loose radiator	4
Disabled water pump	15
Inoperative fan	2
Leaky water jacket	50
Fan belt off	1
Ignition—	
Loose terminal	1
Broken terminal	2
Dead battery	2
Lost commutator cover	2
Disabled commutator	20
Inoperative ignition control	5
Disabled magneto	20
Loose magneto	4
Steering—	
Broken tie rod or drag link	500
Bent tie rod or drag link	25
Broken steering rod	500
Bent steering rod	25
Faulty steering gear	500
Loose steering connections	15
Broken steering knuckle	500
Bent steering knuckle	15
Broken front axle	300
Machinery Parts—	
Broken valve	5
Broken or impaired valve spring	2
Broken cam	200
Broken camshaft	200
Broken crankshaft	200
Bent crankshaft	250
Broken valve rocker arm	10
Broken push or valve lift arm	10
Broken transmission shaft	100
Broken cardan shaft	100
Broken driving chain	30
Broken gear or pinion	25
Broken bearings	10
Broken body or chassis bolts	2
Loose body or chassis bolts	1
Lost body or chassis bolts	2
Broken clutch	250
Broken or impaired universal joint	50
Broken or lost bonnet fastener	2
Loose bonnet fasteners	1
Broken or impaired sprags	5
Broken shock absorbers	5
Loose shock absorbers	2
Steam—	
Leaky condenser	20
Leaky generator	50
Faulty thermostat	20
Faulty pilot light	20
Faulty flow motor	20
Faulty gauge	5
Steam leak in line	1
Water leak in line	1

In cases of leaky radiator or waterjackets, recognition must be taken of the degree of leakage and the amount of fixed penalty modified accordingly.

517—Front and Rear Axles—No penalty shall be imposed when the spread between the two front or two rear wheels, measured at the ground, is ¼ inch or less. When the spread exceeds ¼ inch, the penalty shall be 5 points for each ⅛ inch or fraction thereof.

518—Springs—A sag of 1 inch is permitted without penalty. For each additional ½ inch, or fraction thereof, 5 points.

519—Motor Stops—Motors may be stopped at controls and while gasoline is being taken on. Other stoppages of motors between the starting and finishing of each day's run will result in a penalty of 1 point per minute or fraction thereof for time stopped when no work is done on car.

No penalty, however, shall be charged for a motor stop during the time occupied by a replacement or work on a car for which replacement or work a penalty is imposed.

520—The use by a contestant of any part which may be carried by any other car accompanying the tour as a contestant or otherwise, or which constitutes a part of its make-up or equipment, shall cause the disqualification of the car.

521—In recording time to be penalized, the operator of the car and the observer must mutually agree as to the time when work commences, which shall be immediately recorded on the observer's card, and as to the time when such work ceases, which shall also be likewise immediately recorded.

NON-CONTESTANT

522—Non-contesting cars must wear a sign or banner, approved by the promoter, bearing the words non-contestant, in letters 4 inches high on the sides and front, and such cars shall be subject to all road rules and regulations of the contest.

523—A car having withdrawn from the contest will be permitted to continue the run, but without the official numbers and all banners and numbers must be surrendered to the promoter as soon as the car be withdrawn and the words non-contestant displayed as provided in rule 522.

AWARDS

524—At the close of the contest and after receipt of the report from the technical committee of their final examination, the referee shall post on the bulletin board at official headquarters, rule 430, his decisions as to the awards.

528—Summary of Penalties.—Time—1 point per minute, or fraction thereof, late in arrival at any control or checking station.

Work—1 point per man per minute, or fraction thereof, for labor by driver or passengers.

2 points per man per minute, or fraction thereof, for labor by workmen other than driver or passengers.

2 points per man per minute, or fraction thereof, for replacement of damaged parts by driver or passengers.

4 points per man per minute, or fraction thereof, for replacement by workmen other than driver or passengers.

3 points per occurrence for replenishing gasoline, oil or water, outside of fuel controls.

Motor Stops—1 point per minute, or fraction thereof, for motor stop when no work is done. No penalty for motor stop during period when work is being done on car, for which work or replacement a penalty is imposed. See rule 519.

POWERS OF BOARD COMMITTEE

1. The committee of the contest board shall manage the tour, with full power to enforce the rules, render decisions and do anything else that would be within the province of the contest board of the American Automobile Association.

2. The committee or its representatives shall have power at all times to make such examinations of the cars and their contents as may be deemed advisable.

3. The committee shall have power to disqualify any car for traveling at any speed which it may consider excessive under the conditions existing at the time, and without reference to these rules.

GENERAL

Entrants, drivers and observers shall consult the bulletin board at headquarters each night for additional information; failure to do so will be at their risk. All points not covered directly with these rules will be subject to the general 1910 contest rules.

HOTEL ACCOMMODATIONS

Hotel arrangements will be under the management of competent hotel men who have had large experiences in rooming guests at conventions and other gatherings. These men will take complete charge of the rooming at each night's stop. The committee particularly requests that no individual hotel reservations be made in advance. No preference will be shown in selection of rooms.

Each contestant must take care of and handle such baggage as he and his guests need.

Published Weekly
The CLASS JOURNAL COMPANY
1200 Michigan Avenue
CHICAGO
New York Office, 239 West 39th Street

MOTOR AGE

Subscription Rates
United States and Mexico, per year, $3.00
Other countries including Canada, $5.00

Entered as Second-Class Matter September 19, 1899 at the Postoffice at Chicago, Illinois, under Act of March 3, 1879

Mixed Measurements Bad

UNITED action is at present needed by the motor car and accessory manufacturers on the matter of whether metric measurements should enter into car construction. At the present time a mixed system of measurement is in vogue, parts of a car being made in millimeter sizes to meet French conditions, and other parts made in the English system of measurements by inches and feet. The difficulty of having two systems is apparent, and enters into not only the factory departments, but permeates the selling and supply business from one part of the country to another. Today many makers are fitting spark plugs of metric sizes solely because they want to use a French spark plug. If French spark plugs are better than American plugs, and American buyers want to use them in quantities more than twice as great as French makers, then there is no reason why the French maker should not manufacture the plug in English measurements rather than the American maker put metric sizes into his car. A mixture of systems is bad, and the evil is growing. It not only is confined to car parts, but almost 50 per cent of our tire makers manufacture metric sizes.

IT is exceedingly unamerican to use the metric sizes under the present circumstances. The American industry is of more importance to several of these foreign makers than their home trade, and if conditions are so valuable to them it is only right that they should meet our demands and manufacture English sizes. If an American maker wanted to market spark plugs abroad, he would first of all make them in metric sizes, and why should our car builders not insist on the same from French builders? As a result of several of our makers using metric-size spark plugs American makers of spark plugs have been compelled to manufacture them in metric and English measurements, which is naturally a hardship. This condition is bound to grow, in fact, one or two makers are discussing the advisability of using metric sizes for the cylinders. As to whether metric or English measurements are used is not a local matter for this or that factory, but a question which concerns the entire industry, and is one which the manufacturers should get together on, and if they purpose adopting metric measurements in certain parts there should be a general plan formulated and if they purpose discontinuing the metric system it should be generally understood. It is an expense and inconvenience to have a mixed system as at present.

ALREADY the matter of accidents with motor cars, due to the opening of the touring season, has begun to attract public attention, and already some of the daily press are giving front page columns to the recital of accidents due to the motor car. Some hold that this waving of accidents in the public eye is a good advertisement to motoring, but Motor Age fails to see how any man can be induced to buy a car by reading how another man has been killed by driving one. The fewer accidents there are the more cars will be sold and it is imperative on those who have the interest of the industry at stake to exercise every prerogative to prevent accidents. Salesmen, in particular, should caution new owners against taking chances by speeding before they have become masters of their cars. Many accidents are due to ignorance of how a car behaves when it strikes a wet spot on the road, or skids on a slippery pavement.

Preventing the Dust

THE last couple of seasons have proven conclusively that the advent of the motor car calls for a reconsideration of road construction. The days when macadam construction held complete sway are over. This road construction proved serviceable for horse-drawn vehicles but is entirely unsuited for motor vehicles. The macadam road is unsuited for motor cars in that the road surface material is not sufficiently bound together into a solid mass, the only cementing consisting of the water and rolling used in the construction of the road. It has taken road makers a long time to discover this and it has only been discovered by such states as some of the leading New England ones in which highway associations or commissions, which have the control of the road situation, have actively taken up this work.

THE federal government has given direct aid to road construction through its road inquiry division, under the direction of Logan Waller Page, which has collected more data on this question than any other organization in existence. In his address last week before the Massachusetts Highway Association Mr. Page went into details on the matter of dust preventives and roads, bringing out the fact that it is one thing to build a road and it is another thing to keep that road in condition. The best macadam, as proven by experience, is soon destroyed by motor car traffic, for reasons already stated, and what is needed is a road construction in which the crushed stone is bound or cemented together in a permanent manner, so that the finished road is not unlike an asphalt construction.

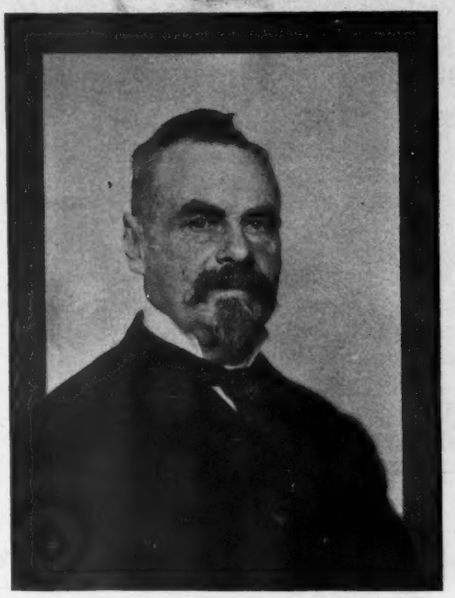
IN speaking of the different methods of attacking the dust situation, Mr. Page referred to three possible means of attack: First, removal of the dust from the road surface as is done in cities; second, the application of some preventive such as water, oils, calcium chloride or other products; and, third, the construction of a road in which a permanent binder is used so that the possibility of the surface materials disintegrating rapidly and forming dust is guarded against. Naturally the last two means are the most probable ones at the present time, and of these the use of a permanent binder is proving the most popular. Roads with a permanent binder naturally cost more to build than the macadam type but they are cheaper in the end, due to the fact that the sprinkling of them two or three times a day is not necessary nor is the application of oil or tar at certain times each year. It has taken some time to discover which method of road construction is cheapest, but now that certain highway associations have been sufficiently aggressive to take up this matter there is no reason why other states cannot at least make use of what is handed to them in the way of road information and redeem their good name by constructing good roads.

IT does not mean that every state must build nothing but roads with some form or another of permanent binder which gives an asphalt surface. The experience of road builders has shown that clay soil and soils of a mixture of clay and sand can be treated annually with an application of refined tar, residual oils or other binders with the result that for a whole season these roads will be free from dust and the oil composition will naturally run off the water and give a road that is fairly satisfactory for the touring season.

DEATH CLAIMS A PIONEER—T. B. JEFFERY

CHICAGO, April 4—A cablegram from Pompeii, Italy, received yesterday, announces the sudden death there of Thomas B. Jeffery, head of Thomas B. Jeffery & Co., of Kenosha, Wis., manufacturers of Rambler motor cars, who passed away shortly after 12 o'clock Sunday morning at the Grand hotel. The remains will be shipped back to the United States at once, the state department at Washington having notified the consul at Naples to care for the body. Relatives of Mr. Jeffery are much shocked at the sad news and are at a loss to explain his demise, for the cablegram conveyed no details as to his last illness. Mr. Jeffery and his wife were on an extended tour through the orient, having left their Kenosha home January 24, arriving in Pompeii only 3 days ago. The last letters received from them, which came yesterday, were mailed from Jaffa, and stated that Mr. Jeffery was in robust health at that time.

The death of the manufacturer of the Rambler car follows closely in the wake of those two other motor car pioneers, Colonel Albert A. Pope, and George N. Pierce. While Mr. Jeffery had not severed his connections with the Rambler concern as did Mr. Pierce with the Pierce-Arrow,



THE LATE THOMAS B. JEFFERY

he had turned over the active management of the business to his son, Charles T. Jeffery, who has been general manager of the company for some time. It is stated that the death of Thomas B. Jeffery will make no difference in the business policy of the company. Besides Charles T. Jeffery, Mr. Jeffery is survived by a widow and three other children—Mrs. A. R. Carqueville of Chicago, Mrs. H. N. Hudson of St. Louis and Harold W. Jeffery. Mr. Jeffery was married in 1874 to Kate E. Wray of Chicago.

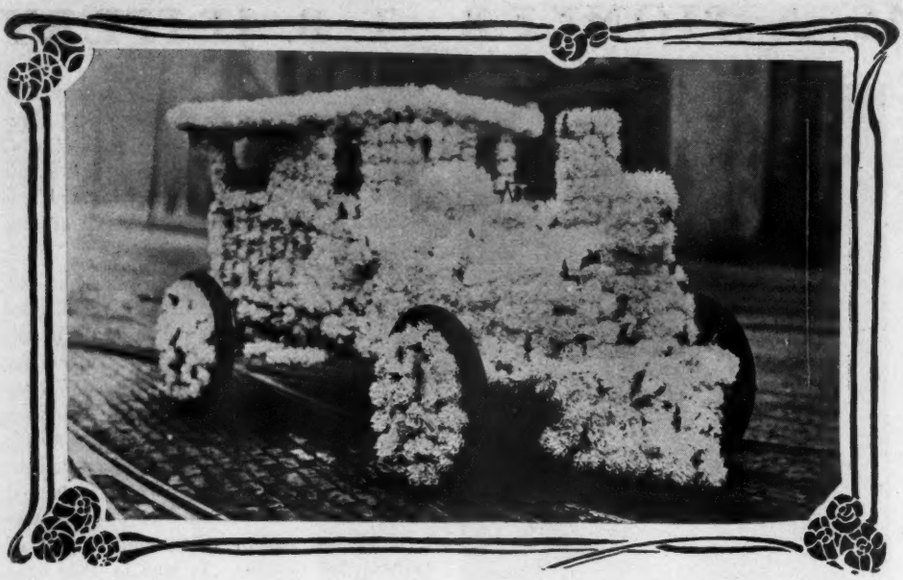
Mr. Jeffery not only was the second oldest motor car manufacturer in the United States but he also was the inventor of the G & J clincher tire and was famed for his mechanical inventions. He was born in Stoke, Devonshire, England, February 5, 1845, coming to the United States at the age of 18 and settling in Chicago, following his trade as a maker of astronomical instruments. In addition to this he was a maker of patent office models and of railway velocipedes. It was in 1878 that he and R. Philip Gormully established a factory in Chicago for the purpose of manufacturing bicycles which industry he followed for 22 years when the Gormully & Jeffery company was absorbed by the American Bicycle Co. Mr. Gormully died in 1898 and that same year Mr. Jeffery became interested in the motor car. In 1900 he moved to Kenosha, Wis., where he bought the Sterling bicycle factory and turned it into a motor car plant.

ROAD RACES, TRACK MEETS, RELIABILITY RUNS AND HILL-CLIMBS SCHEDULED FOR SEASON OF 1910

April 7-9—First annual show at Davenport, Ia.
April 8-10 and 13-17—Opening meets at new board motordrome, Los Angeles, Cal.
April 23-29—Second annual show at Bangor, Me.
April 28—Economy run of Chicago Motor Club to Lake Geneva and return.
April 30-May 2—Reliability run to Atlantic City, Quaker City Motor Club, of Philadelphia.
May 2—Start of flag-to-flag endurance run from Denver, Colo., to the City of Mexico.
May 5-6-7—Speedway races at Atlanta, Ga.
May 9—Road race at Santa Rosa, Cal.
May 9-10-11—Reliability run of Motor Club of Harrisburg, Pa.
May 13-14—Track meet of Motor Contest Association, Brighton Beach, New York.
May 15—Track meet of Santa Rosa Automobile Association, Santa Rosa, Cal.
May 18-19—Reliability run of Norristown Automobile Club, Norristown, Pa.
May 19-20-21—Reliability run of Automobile Club of Hartford, Hartford, Conn.
May 22—Reliability run, Fort Worth Star-Telegram, Fort Worth, Tex.
May 29—Spanish voiturette road race for Catalunya cup.
May 27-28-30—Speedway meet at Indianapolis.
May 30—Track meet of Bay State Automobile Association, Boston.
May 28-30—Track meet of Automobile Club of Kansas City, Kansas City, Mo.
May 30—Hill-climb of Automobile Club of Bridgeport, Bridgeport, Conn.
May 30—Decoration day road race of Denver Motor Club, Denver, Colo.
May 29-30-31—Speedway meet at Los Angeles, Cal.
May 27-31—Reliability run of Washington Post, Washington, D. C.
June 1—Road races of Motor Contest Association, Riverside, L. I.
June 4—Track meet of Quaker City Motor Club, Philadelphia.
June 4—Annual hill-climb of Worcester Automobile Club, Worcester, Mass.
June 11—Annual Giant's Despair hill-climb, Wilkes-Barre, Pa.
June 11—Road races of Portland Automobile Club, Portland, Ore.
June 18—Hill-climb of Upper Westchester A. C., Ossining, N. Y.
June 15-29—Annual Glidden tour. Start Cincinnati, finish Chicago.
July 1-2-4—Speedway meet at Indianapolis.
July 1-10—Road carnival of licensed dealers at Los Angeles, Cal.
July 2—Reliability run of North Wildwood Automobile Club, Philadelphia.
July 2-3-4—Speedway meet at Los Angeles, Cal.
July 4—Track meet of Motor Club of Wildwood, N. J.
July 4—Track meet of Dallas Automobile Club, Dallas, Tex.
July 4—Track meet of Cheyenne Motor Club, Cheyenne, Wyo.
July 4—Hill-climb of Automobile Club of Auburn, Auburn, N. Y.
July 4—Track meet of Minnesota State Automobile Association, St. Paul.
July 11—Hill-climb of Plainfield Automobile Club, Plainfield, N. J.
July—Hill-climb at Richfield Springs, N. Y.; middle of month.
July—Road race of Grand Rapids Automobile Club, Grand Rapids, Mich.; middle of month.
July 30—Track meet of North Wildwood Automobile Club, Wildwood, N. J.
August 1—Reliability run of Minneapolis Automobile Club, Minneapolis, Minn.
August 1-September 15—French industrial vehicle trials.
August 6—Track meet of Quaker City Motor Club, Philadelphia.
August 12-13—Speedway meet at Indianapolis.
August 15—Annual hill-climb of Chicago Motor Club at Algonquin, Ill.
August 15—Start of Munsey tour.
August 17—Track meet at Cheyenne, Wyo.
August 31—Reliability run of Minnesota State Automobile Association.
September 2-3-5—Speedway meet at Indianapolis.
September 3—Reliability run of North Wildwood Automobile Club, Wildwood, N. J.
September 5—Track meet at Wildwood, N. J.
September 5—Track meet at Cheyenne, Wyo.
September 5—Speedway meet at Los Angeles, Cal.
September 5—Road race of Denver Motor Club, Denver, Colo.
September 5-10—Track meet at state fair, Minneapolis, Minn.

SOUTHERNERS IN A TEST

Savannah, Ga., April 6—Special telegram—Twenty-one of the twenty-two cars which left Savannah on Monday morning for Jacksonville, Fla., arrived there Tuesday evening at 7:30. The only car to fall out was a Franklin from Brunswick, Ga. At Darien and Callahan the worst roads were found. Savannah was left Monday morning at 8:30 and Brunswick was reached at 6:27 that evening. The cars left here Tuesday morning at 9:57, arriving in Jacksonville at 7:30. The official distance was 98.1 miles. The technical committee will not go over the cars until tomorrow morning and the scores of the cars will not be made known until that time. Those whose observers' cards show a perfect score before the examination by the technical committee are: Maxwell, J. L. Highsmith; Hupmobile, Chris Jacobs; Buick, H. B. Flanders; Buick, L. R. Akin; Maxwell, Mrs. L. W. Hazard; Maxwell, W. H. Towles; Buick, Darwin B. Hull; Maxwell, Rev. Francis Alan Brown; Maxwell, Henry A. Brantley; E-M-F, W. C. Thompson; Maxwell, W. C. Adams; Cole, R. S. Brown; Maxwell, Robert Brockett; Lancia, Harvey Granger; Acme, Eugene Maner; Packard, N. G. Brown; Stevens-Duryea, A. W. Solomon.



Hoosiers Hold

INDIANAPOLIS, IND., April 4—More than 200 tradesmen and their guests, gathered around a banquet table at the Denison hotel Saturday night, celebrated the close of the most successful opening week the local motor car industry has ever had. The banquet was given under the auspices of the Flat Tire Club, while the opening week was arranged by the Indianapolis Automobile Trade Association.

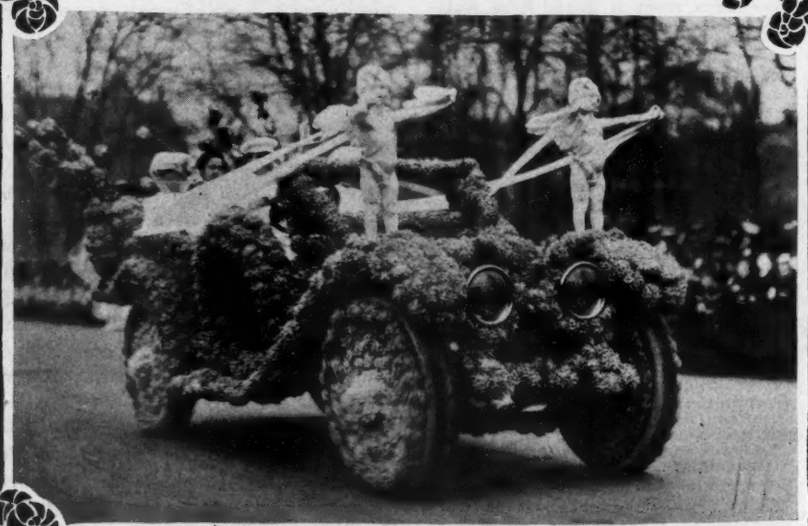
Seldom have banquets given here been more elaborate. Following the menu, F. I. Willis, president of the trade association, introduced Charles A. Bookwalter, former mayor, as toastmaster. A. G. Batchelder of New York city, chairman of the executive committee of the American Automobile Association, was the guest of honor and the first and principal speaker of the evening. He urged an active state organization, uniform laws and the federal registration bill. Another speaker was Governor Thomas R. Marshall, who said the motor car is one of the best influences working today to make the American people what they should be. He urged motorists to come to the next session of the Indiana legislature for any legislation they may wish, pledging his support for anything that is good, and his opposition to bad legislation that may be presented.

H. O. Smith, president of the Premier Motor Mfg. Co., and D. M. Parry, president of the Parry Automobile Co., were others who spoke.

Throughout the week each of the forty-five salesrooms was decorated and many gave concerts with bands or orchestras. Each dealer had a full line of 1910 models on display. The United Manufacturers had an interesting display which was shown by the Hearsey-Willis Co., Monday and Tuesday; Gibson Automobile Co., Wednesday and Thursday and by the Willis-Holcomb Co., Friday and Saturday. The Fisher Automobile Co., as an added attraction, has a display of aeroplanes. A model of an aeroplane was also shown by the Nordyke & Marmon Co. The Indiana Automobile Co. gave a number of lectures daily on Chalmers construction. A tent was used for displaying the Austin.

From the opening hour Monday morning until the week closed Saturday night ideal weather conditions prevailed. Each of the outdoor events was a distinct success, including the floral parade Wednesday afternoon, the tests of skill at the Indianapolis motor speedway Thursday and the industrial parade on Friday. An accurate estimate of cars sold during the week cannot be obtained. Some of the accessory dealers claim that they sold out their entire reserve stock and some of the salesrooms, at the end of the week were even bereft of their sample cars for display use.

The floral parade was the most interesting public event of the week, and was the only affair of its kind ever seen in Indianapolis. This parade was held Wednesday afternoon. Thirty-eight cars, decorated in natural and artificial flowers, passed in review, there being three sections — private owners, dealers and unique. The judges awarded prizes in the different events as follows: Priv-



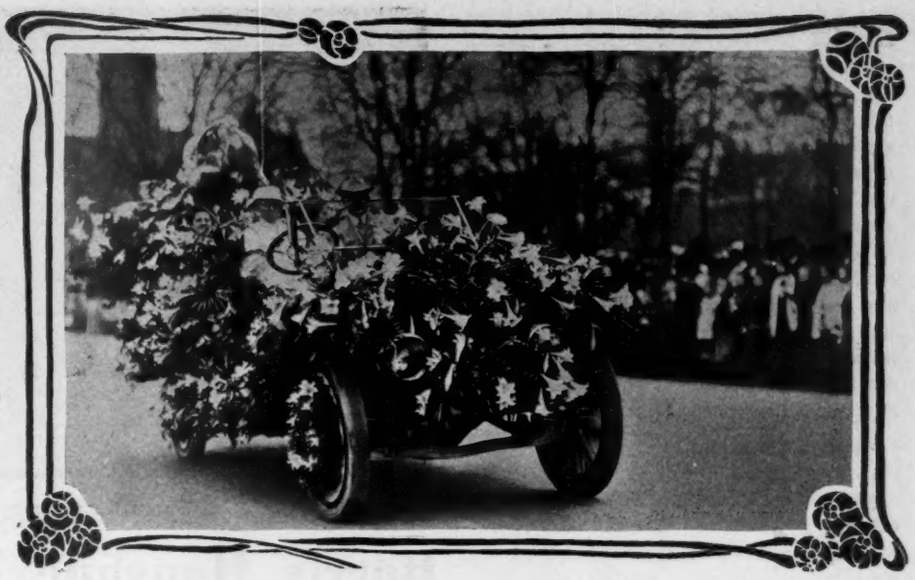
TOP—THE HUPMOBILE LOCOMOTIVE
MIDDLE—THE PACKARD BATTLESHIP
BOTTOM—OLDSMOBILE, FIRST PRIZE WINNER

Floral Parade

vate owners, Louis Deschler, driving a Chalmers, first prize, and Edward G. Sourbier, driving a Marion, second prize; dealers, W. A. Wildhack, of the Buick Motor Co., driving an Oldsmobile Limited, first prize; unique, Willis-Holcomb Co., represented by a Packard float, first prize. Mrs. Ed Rosenberg, who drove a Premier, has contested the award to Mr. Sourbier on the ground that the latter is a dealer and not a private owner.

The Packard float, winning first prize in the unique section, was a pretentious affair. Mounted on a truck was a representation of a gunboat, the American Beauty. The hull was of white, decorated with 1,000 natural American Beauty roses. On the deck rode the Indianapolis military band, while on the bridge were two small boys in white. The float was 50 feet long. Riding with Mr. Deschler were young women in white. The car was covered with 1,000 natural lilies and ferns. In the rear of the car was a gold basket filled with lilies, and from this wide strips of white ribbons were hung in festoon shape along the body and fastened in large bows on the hood.

Mr. Wildhack's car was decorated with a mass of artificial yellow chrysanthemums. At either side of the car, in front, were two cupids with their arms outstretched, holding long streamers of white ribbons which were tied to the rear of the car in bows. The Marion car driven by Mr. Sourbier was covered with American Beauty roses and pink carnations. At the sides of the front and rear seats were suspended large baskets, filled with roses, while the running boards were covered with carnations. Mrs. Rosenberg's Premier was decorated with artificial black-eyed daisies, the design being that of a flower basket, with a large handle extending in an arch over the heads of the passengers.



There were many cars that attracted much favorable comment. John Orman, of the Premier Motor Mfg. Co., converted a Premier truck into a representation of a southern plantation scene. At one end was a cotton field, in which negroes paused from their work now and then to sing negro melodies. At the rear end was a typical southern cabin. The Hearsey-Willis Co. was represented in the unique division by a Hupmobile runabout, decorated by F. I. Willis to represent a locomotive. It was covered with white and pink carnations, and at one window sat a smoke and oil-begrimed engineer in overalls. A Chalmers was decorated to represent a bell, the emblem of the Bell telephone. The flowers were artificial white and blue chrysanthemums. A Premier was decorated with real American Beauty roses. At each corner of the car was a draped pillar on which rested a pot of blooming azaleas. Bright red ribbons entwined in the design added much to the scheme.

Mrs. F. I. Willis and little daughter were in a Hupmobile, representing a huge flower basket filled with various kinds of artificial flowers. A Buick was decorated with brown and gold artificial chrysanthemums, while in front was a white swan made from white flowers. At the top of the car

TOP—WINNING CHALMERS IN OWNERS' CLASS
MIDDLE—THE BUICK SWAN
BOTTOM—PREMIER'S DECORATED TRUCK

was a doll dressed in white, holding reins fastened to the swan, making a pretty effect of the car being drawn by the swan. Six young women in white were in a Premier which was covered with pink chrysanthemums. A Ford was covered with massive artificial sunflowers. A Rambler was decorated with artificial flowers, with a large horseshoe in front. A Premier finished in a delicate lavender was driven by Mrs. H. O. Smith, who with six women and a little girl occupied the machine. It was decorated with sweet peas and green smilax and the occupants were gowned in cream-colored serge, with lavender veils and lavender parasols.

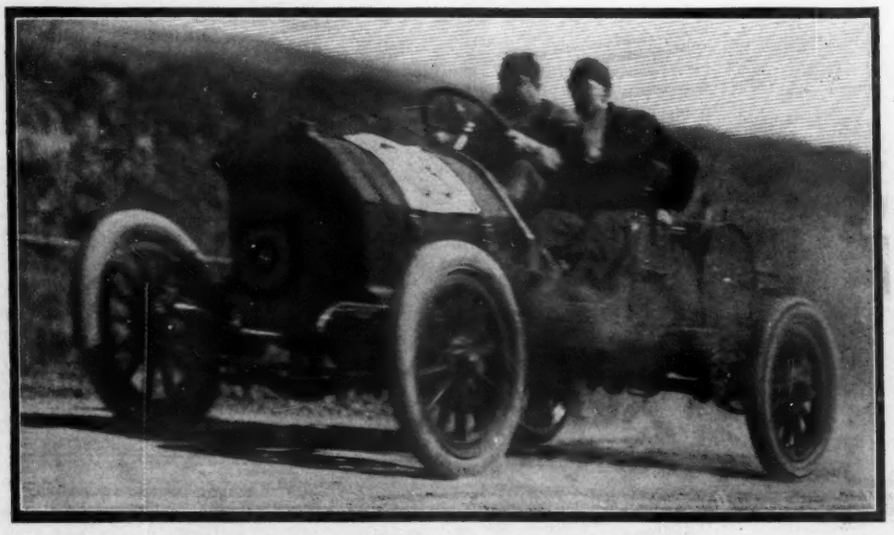
About 5,000 people attended the contests at the Indianapolis motor speedway Thursday afternoon, no admission fee being charged owing to the fact that the speedway management donated the use of the grounds. There were six separate gymkhana events, the one receiving the most points in the six, winning the prize. These events were a balloon contest in which toy balloons were to be crushed, a circus ring, consisting of throwing a cap through a ring 2 feet in diameter and catching it while the car was in motion; a juggling contest, following a course of confetti between obstructions; a cane rack, throwing rings over pins distributed along the course; a potato race, throwing potatoes into receptacles and a teeter board 24 feet long and 6 feet wide, resting on an 18-inch fulcrum, the driver being required to balance his car on the board 30 seconds. Disqualification in any event counted a demerit of 25 points. Bert Bronson, in an Austin, won first prize with 430 points; Harry Endicott in a Cole 30 was second with 360 points; H. W. Martz in a Maxwell came third with 325 points and C. R. Johnston in a Buick was fourth with 320 points. The Willis-Holcomb Co. entered a Packard truck and the Delaware Garage a Chase truck, both of which made an excellent showing. The industrial parade Friday was the concluding event for the general public. This was a review, or parade of 1910 models, more than 300 new cars being shown, ranging from a small runabout to a limousine and 5-ton truck. Every dealer and manufacturer in the city was represented by one car of each model sold or manufactured by him. Each car was designated by a neat card stating the horsepower, make, price and name of dealer and manufacturer. The cars also were permitted to carry pennons of uniform size supplied by the association. To the Fisher Automobile Co., which has seven agencies, was given the credit of having the largest number of cars in line, being represented by fifteen machines. The Buick Motor Co. was second with ten Buicks, two Oldsmobiles and one Welch car. All of the cars were devoid of special decoration and each was required to carry full catalog equipment.

Experience has shown that the local method of each dealer and manufacturer showing in his own place of business and uniting in a number of public events, is probably as successful as giving an exhibition under one roof. At any rate the plan will be continued in Indianapolis.

A state motor club was formed at a meeting held at the Denison hotel Saturday night, prior to the banquet, and will affiliate with the American Automobile Association. Carl G. Fisher, president of the Indianapolis Motor Speedway Co., was selected as president. Other officers elected were: A. D. Cressler, of Fort Wayne, and W. Mack Morris, of Peru, vice-presidents; F. I. Willis, Indianapolis, treasurer, and A .R. Kling, secretary.

FORD WHICH DID WELL IN SAN FRANCISCO HILL-CLIMB

Harris Hanshue In The Apperson



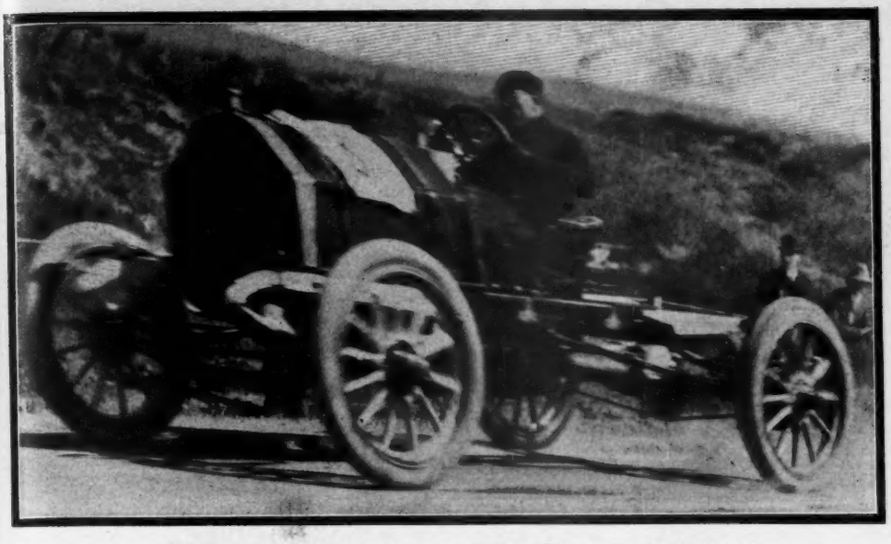
HANSHUE IN APPERSON, WHICH STARRED IN FRISCO CLIMB

BOSTON HAS A FIRE

Boston, Mass., April 2—The garage here occupied by the Lozier company was burned yesterday and a number of cars were destroyed or badly damaged. There were about thirty cars in the garage at the time. Of this number fourteen were new machines belonging to the Lozier agency, having an average valuation of about $4,000 each. Eleven other cars were damaged to an extent of about $1,000 each. It was estimated that the loss on the motor cars reached $67,000 while the building was damaged about $5,000.

POST PLANS 5-DAY RUN

Washington, D. C., April 4—A 5-days' tour to Richmond, Va., and return is being planned by the Washington Post. May 27-31 are the dates selected. The route will be via the Shenandoah valley to Staunton, and from there through the Rock Fish Gap, Charlottesville and across the James river plateau into Richmond. Ashland, Cuckoo, Louisa, Gordonsville, Orange Courthouse, Culpepper, Remington, Manassas and Fairfax Courthouse will be among the historic towns that will be encountered on the homeward trip. The distance to be covered is about 400 miles. The contest will be run under grade 3 of the new reliability rules.



PENNSYLVANIA WHICH TIED FOR SECOND PLACE IN FREE-FOR-ALL

Stars In San Francisco Hill-Climb

SAN FRANCISCO, CAL., March 31—There were two distinct features to the second annual hill-climb on the Nineteenth avenue boulevard, held yesterday under the auspices of the San Francisco Motor Club. One was the fast time made by Harris Hanshue in his Apperson Jackrabbit and the other was the successful inauguration of a week-day meet in San Francisco. Hanshue handled his car, the same one in which he won one of the big Portola road races on the Oakland foothill course last October and in which he made a mile in a trifle over :44 last week on the newly constructed motordrome near Los Angeles during a trial, in admirable fashion and appeared to get all the speed possible out of it. His best time was made in the free-for-all. In this event he covered the course, which is a grade 1 1/20 mile long, in 1:07. This time cut 5 seconds from the best time made in last year's contest, which record was established by the White steamer. It also lowered the best record made by the gasoline cars in the 1909 hill climb, when the best time made by cars of this description was 1:15.

Hanshue was not the only driver to lower last year's gasoline car record, for no fewer than twelve other cars crossed the finishing tape below the 1:15 time, and as for the White steamer's record of last year, this was beaten by four other drivers besides Hanshue this year.

In the first event a Mitchell driven by H. R. Cousins captured the prize for little cars by defeating a Ford and Buick handily. The time was 1:13; this began the breaking of last year's records for the gasoline cars. In event number two a Corbin and Winton were the only contestants and the former nosed out the victory by covering the course in 1:14⅘, while it took the Winton ⅖ second longer to reach the finishing tape.

Then came the event for big cars, which was generally believed and did foreshadow the victor of the free-for-all. A Thomas 70 was the first starter and reached the finishing post at the crest of the grade in 1:11⅖. This car was the first to lower the fastest record made in the 1909 test. With Charles Soules at the wheel a big Stearns shot over the finishing tape next, covering the course in ⅕ second slower than did the Thomas. The Apperson reached the finishing post in 1:07⅘ and established the best record so far for the day. A 1910 Stearns which had made a continental trip and weathered a sandstorm in Death valley was piloted by its owner, A. Hanson, but as for time this car failed to make as good a record as it did in weathering the elements during its long trip from Saratoga, New York.

In the event for medium-priced cars a bin, which during the week in trials made some fine time. However, the expected failed to happen and the Corbin did not better than earn fifth place. A Stanley steamer of the early type was believed a dangerous contender for the prize. This car won the event last year. O. C. Joslen, the owner and driver, did not seem inclined to risk his neck to too great a degree and is said to have not got all the speed possible out of this little steamer. However, he lowered his last year's time considerably by making the ascent in 1:09⅘, which time was later tied by the big Pennsylvania and second place honors divided.

With the report that Hanshue in the Jackrabbit had started, the crowd at the finish waited with keen encitement to see the daring driver cross the tape. Like an arrow he shot up the course amid the cheers of the crowd and finished in 1:07 flat, reducing his previous time ⅘ second.

The boulevard was well-policed, the crowd being kept to the side by a heavy wire cable and this gave the drivers an excellent chance to see far ahead and let loose their cars. No accidents marred the contest and the motor club officials pulled it off with clock-like precision. An electric timing apparatus was used and the cars were sent up the grade from a standing start. Summaries:

CLASS 1, $1,250 AND UNDER.

Car and driver—	Time.
Mitchell, H. R. Cousins	1:15
Ford, A. Ruddle	1:18
Buick, Frank Murray	1:42⅕

CLASS 2, $1,251-$2,000.

Buick, Frank Murray	1:12⅖
Maxwell, C. Q. King	1:13⅗
Autocar, Walter Morris	1:18
Buick, Lardher	1:25
Auburn, D. Longwell	1:28⅗
Crawford, W. R. Shadburn	1:52⅕

CLASS 3, $2,001-$3,000.

Corbin, A. Loughead	1:14⅖
Winton, McDonald	1:14⅘

CLASS 4, $3,001-$4,000.

Knox	1:39⅗

CLASS 5, $4,001 AND OVER.

Apperson, Harris Hanshue	1:07⅘
Thomas 70, Charles Allen	1:11⅖
Stearns, Charles Soules	1:11⅗
Stearns, Hanson	1:21

FREE-FOR-ALL.

Apperson, Harris Hanshue	1:07
Stanley steamer, O. C. Joslen	1:09⅖
Pennsylvania, Earl Cooper	1:09⅗
Thomas 70, Charles Allen	1:10⅗
Stearns, Charles Soules	1:12⅖
Corbin, A. Loughead	1:14⅘
Maxwell, C. O. King	1:15
Mitchell, H. R. Cousins	1:17
Stearns, Hanson	1:18⅘
Autocar, Walter C. Morris	1:18⅘
Ford, A. Ruddle	1:19⅖
Buick, Frank Murray	1:20⅗
Auburn, D. Longwell	1:27⅖
Crawford, W. R. Shadburn	1:40⅘

COUSINS IN MITCHELL, WINNER OF CLASS 1

Detroit Adds to Motor Capital

DETROIT, MICH., April 5—Recent increases in the capitalization of motor car manufacturing concerns in Detroit have resulted in so swelling the total investment in the industry locally as to bring it very close to the $30,000,000 mark, exclusive of the large amount invested in Detroit in the manufacture of parts and accessories, and in the retail industry, both departments of which have made remarkable strides. The most prominent increases of late have been made by the Lozier's incorporation for $2,000,000, the Metzger's raise from $500,000 to $1,000,000, the Hupp's increase from $50,000 to $250,000, the Regal's increase from $100,000 to $1,000,000 and the new $500,000 Carhart company. In several of these cases the capital has been paid in. In others it has been re-distributed in the form of dividends. In others it is placed on the market.

The most recent announcement of an increase comes from the Detroit-Dearborn Co., which has authorized an increase from $50,000 to $100,000 and is now moving into a larger factory. Other advances are supposedly in order elsewhere. The older Detroit factories nearly all have capitalizations which are far from representing the actual amount of money invested in the business, the increase over the figure of original capitalization having been through the re-investment of dividends of former years. It is generally predicted that, as the business grows, the general trend will be to put it on a basis where the investment will more nearly be commensurate with the capitalization.

Production in Full Swing

The local factories which contemplated the construction on a large scale of 1910 models are now in full swing and the production is progressing at a prodigious rate—far in advance of anything in former years and considerably faster than was the general prediction at the time of the factory announcements. The Ford announces that more than 4,000 cars have been shipped since January 1. The E-M-F has been averaging sixty-five cars a day from its Piquette avenue plant, with Flanders cars coming through with increasing rapidity at the Clark avenue branch. The freight car famine which was predicted for the date when the maximum production should be reached has not been in evidence for the past month, as the railroads have made especial efforts to provide enough cars—efforts which have proven, in the main, successful.

The annual meeting of the Detroit Automobile Dealers' Association was held at the Hotel Tuller Tuesday evening, at which the former staff of officers was re-elected with the exception of Vice-President John P. Schneider, forced to withdraw on account of ill health. George E. Lane was re-elected president. George D. Grant was chosen vice-president. Robert K. Davis will continue to discharge the duties of secretary-treasurer. After mature deliberation the association decided to abolish the annual 4-day endurance run. The dealers discussed at considerable length the matter of Sunday closing, but did not settle the question.

A Demotcar Rumor

A considerable ripple was created on the surface of local manufacturing by the announcement Monday from the offices of the Demotcar company that Vice-President L. F. Newman, along with the firm's general counsel, was in New York, negotiating for the sale of the concern to a new syndicate. The announcement hinted at a combination with the Studebaker-E-M-F interests, but made no positive statement. No confirmation of this rumor could be secured at the E-M-F factory, however. News from New York is eagerly awaited by the stockholders of the Demotcar, who are very numerous in Detroit, the money for the start of this concern having been derived very largely by exploitation through the columns of the local newspapers. The Demotcar factory bears the evidence of prosperity and the plant has produced as many as forty-five cars a week. The pattern on which work is in progress is a light runabout with double-opposed motor. It is understood, however, that the firm's designers and testers are now at work on a touring car.

A transaction of interest was the purchase by the Warren Motor Car Co. of the new plant of the Detroit Column Co., Holden avenue and the railroad tracks. The property embraces ample room for expansion and now includes three large brick buildings. The Warren company is now building four cars a day and expects to employ its enlarged facilities for the construction of 3,000 cars in 1911. The crowded condition of the present plant has made necessary the leasing of the property of the Detroit Curling Club on Forest avenue W., where all the body finishing department has been temporarily located.

The formal reorganization of the Lozier Motor Co. has been completed. The new officers are: President, Henry A. Lozier; vice-presidents, Gilbert W. Lee, Fred C. Chandler; secretary, Cyrus E. Lothrop; treasurer, Charles H. Hodges. The above named, in connection with Edwin R. Lozier, Lewis H. Jones, E. D. Stair, George G. Booth, Willis Buhl, Harry M. Jewett, Sherman Depew, Samuel Regar, John G. Perrin, Charles A. Emise, Arthur F. Way, Edward F. Flammer, John M. Weaver, George F. Tuttle, and Hugh Herndon, comprise the new board of directors. The plans have been accepted and construction commenced on the new factory which the firm is building in Detroit. Construction will be of steel and concrete, with especial attention paid to fire protection, one of the plans being a thorough equipment of automatic sprinklers. It is planned to market 1,200 cars next year, of which half will be made at the Plattsburg, N. Y., factory. All increases in the plants will be confined to the Detroit factory, it is planned, however.

New Factory Announced

A new factory announcement is from the Metal Products Co., which is just completing a four-story cement building to cost $75,000, which will be used for the manufacture of motor car axles. Operations will begin in 30 days with a force of 300 men. It is planned to increase that number to 3,000. The firm has now enough orders to ensure a busy plant for the coming year. It expects to turn out 15,000 axles for 1911 cars. Pittsburg capital is strongly interested in the concern, the directorate including several men who have been prominent with the Westinghouse interests.

During the past week the General Motor staff has been increased by the addition of Dr. Wadsworth Warren of Detroit. Dr. Warren, who has been for several years a practicing physician in

Vanderbilt Cup, Massapequa and Wheatley

NEW YORK, April 2—Definite announcement that the Vanderbilt race will be held on the Long Island motor parkway and the public roads of Nassau county, Long Island, October 1, was made today by the Motor Cups Holding Co. In conjunction with the Vanderbilt race the Massapequa and Wheatley Hills sweepstakes races will be held for small cars. The rules for the Vanderbilt race were recommended by the Manufacturers' Contest Association and are as follows:

1—Circuit, 12.64 miles in length, composed of motor parkway, Massapequa road and old country road, the same as was used in 1909. This circuit has been pronounced one of the best in the country for sustained high speed. The highways are broad, with improved and well-oiled surfaces. There are but four turns, all of which are well banked and easily taken at speed.

2—The race will be started at 9 a. m. and will be run rain or shine.

3—The circuit will be open for at least 10 days of preliminary practice for at least 3 hours per day.

4—The circuit will be covered twenty-two times, making a total mileage for the race of 278.08.

5—Award: The William K. Vanderbilt, Jr., cup, with an added cash prize of $2,000, and a bronze placque by Tiffany & Co. to serve as a permanent award to the winner.

6—The Long Island motor parkway will be open to the actual contestants for at least 3 hours per day 2 weeks prior to the event for practice and tryout purposes.

7—The event will be open to cars owned in this country whose piston displacement in cubic inches is not less than 301 nor more than 600. See class C, 1910, rules of the contest board of the American Automobile Association. The classification imposes no restrictions save those of piston displacement, provided the manufacturer of the car entered has built fifty cars of one or more models during the year preceding the event. It will be noted that cars of 4-C and 5-C will compete as one class for the Vanderbilt cup, in addition to which the donor of the

Detroit, has consented to take charge of the Buick racing team during the coming summer, with a general jurisdiction over the sales of the company during the winter. He will be essentially a traveling representative of the General Motors group throughout the year, it is announced by the company.

The Hupp Motor Co. is intending to take up the European field in the future and will send C. H. Dunlap, assistant sales manager, to the shows to be held this summer and Brussels and Berlin, with a view to looking over the field.

George A. Horner, on April 1, became general manager of the Rapid Motor Vehicle Co. of Pontiac, Mich. Mr. Horner's appointment to his present position gives him supervision of the construction of the immense Rapid plant, now covering 16 acres, and acting in the capacity of factory manager as well.

WORK FOR REGAL PLUGGER

Detroit, Mich., April 5—The Regal Plugger, which last year made a trip of 4,031.8 miles from New York to San Francisco, is to start on Monday, April 11, on a 5,000-mile around the circle trip. The itinerary will include all of the larger cities in the states passed through. The route decided upon is from Detroit to New York by way of Buffalo and Boston; thence towards Kansas City and back to Detroit by way of Chicago. After its completion of its transcontinental trip last year this car made a tour of the country for demonstrating purposes.

PITTSBURG SHOW PAYING ONE

Pittsburg, Pa., April 3—Officials in charge of the fourth annual show at Duquesne garden estimate that 27,500 people visited the show during the 7 nights and 6 days it was in progress. The attendance from outside towns was larger than ever before. Local concerns had a large force of salesmen assisting them in their demonstrations, and report that fully 50 per cent more care were sold than last year, which is pleasing news for all.

Toledo Likes Individual Shows

TOLEDO, O., April 2—The wisdom of the Toledo Automobile Dealers' Association in resorting to the individual show opening, with plenty of room for demonstration and display purposes, has been fully demonstrated by the results of the week's business. The show opened on Monday night amidst a glare of lights which converted motor row into a scene of daylight, and from the opening moment until the close on Saturday evening there was not a dull moment. A unique sight of the show was a line of White cars, on display in the main lobby of the big Spitzer office building. And all along the street was the evidence of cheerful rivalry in the effort to outdo all others in the matter of display. While the machines themselves were not decorated, the entire street was a complete mass of potted plants, cut flowers, bunting, banners, and colored electric bulbs.

An interesting feature was that of the B. F. Goodrich Co., of Akron, manufacturer of tires. The concern rented the large Lyceum theater, which on Thursday night was packed by those who accepted the company's invitation to attend an illustrated lecture describing the many processes employed in the manufacture of a motor car tire. The lecture was entitled "From Tree to Tire," and was accompanied by moving pictures showing how rubber is obtained and the many processes it goes through from the time it is first gathered in the form of sap, by natives in the jungles of South America, and its manufacture into the finished product at the plant. B. F. Tillisch, a representative of the company, delivered the lecture.

A car which attracted more than ordinary attention was a Garford truck which was brought in from Elyria, O., a distance of 96 miles, in 7 hours 10 minutes, an average of more than 14 miles an hour. During the trip it consumed 18 gallons of gasoline and 2 quarts of oil. It was brought in for exhibition purposes and will be driven back to Elyria next week by Manager David T. Davies of the local branch.

The city itself lent a helping hand to make the show a success, and every request made by the dealers was readily granted. Privileges for parades, roping of streets, banners and lighting rights were all granted for the asking. The parade on Tuesday and again on Friday attracted much favorable attention. About fifty cars were in line in the procession representing a value of $150,000. The cars graded according to size and price was headed by bands, and presented an unusual spectacle.

Entertainment of various kinds, including numerous contests of skill and nerve, were provided by the committee having the matter in hand. Among these were a teter-board contest, and a ten-pin drive. The teter-board contest furnished much amusement, and provided a rigid test of the nerve of participants. The cars were required to run up the board until the end tipped down and the front wheels touched the ground. The cars were then backed over the board until the rear wheels touched the ground. Two minutes was then given to run the car forward to center of teter and balance for 30 seconds. Ed Eaton, a mounted policeman, then undertook to show that the motor car was in no sense superior in this contest to his equine, and after several efforts secured the required balance.

A slow race on high-speed gear was pulled off on Thursday, and on Saturday a novelty in the form of a potato race was an interesting feature. Fifteen baskets of potatoes were placed in a zigzag line 25 feet apart. Cars started from a dead stop and run to the first basket, stopped the engine still, the driver dismounting, picking up his potato and put it in his basket, starting his engine, running to the next basket, and repeating the operation.

Altogether the show was a decided success, not only from the standpoint of the number of sales perfected, but from a standpoint of entertainment as well. Financially there is no question but what the single show idea has proven superior in every respect to the collective idea, and it is probable that the effort will be repeated on a larger scale next year.

CONDUIT ROAD CASE UP

Washington, D. C., April 5—Special Telegram—The Maryland legislature has passed the Garrett bill calling upon the attorney general of Maryland to institute proceedings to test the authority of the state of Maryland in enforcing police regulations along the Conduit road leading out of Washington to Great Falls. On top of this comes the announcement that Marshal Collins will probably regain his old position as guardian of Conduit road.

Hill Sweepstakes To Be Repeated in October

cup will present to the winner in the class which covers the course in the fastest time, other than the winner of the cup, a special bronze placque made by Tiffany & Co.

8—The event will be sanctioned by the contest board, and the 1910 rules of the American Automobile Association will govern the conduct of the event.

9—Entry fee, $500 per car. No practice will be permitted nor announcement made until the entry is duly made and the entry fee paid.

10—Reservation of boxes, seats and parking spaces may be made by letter. Payments on account of such reservations may be made at any time, but must be made promptly on request of the Motor Cups Holding Co. on September 1, 1910. Box, seat and parking space schedules will be announced on July 1, 1910.

11—The Motor Cups Holding Co. will open an office and bureau of information in the city of New York on September 1, 1910, where any and all information may be obtained.

12—All cars entered must be examined and passed by the technical committee of the contest board prior to October 1, 1910.

Beginning at 10 o'clock on October 1, 1910, about 1 hour after the Vanderbilt cup race has been started, the motor parkway sweepstakes races will be started, as follows:

Massapequa sweepstakes—Trophy and $1,000 added, for cars with piston displacement of 161 to 230 cubic inches.

Wheatley Hills sweepstakes—Trophy and $1,000 added, for cars with piston displacement of 231 to 300 cubic inches.

For the Massapequa sweepstakes and trophy the 12.64-mile circuit will be covered ten times, making a total mileage of 126.40. For the Wheatley Hills sweepstakes and trophy the 12.64-mile circuit will be covered fifteen times, making a total mileage of 189.60.

German Views on American Ways

BERLIN, March 23—Willy Seck, a director in a big German car-building concern and considered an authority on motoring subjects, has returned from an investigating trip to the United States and in the Allgemeine Automobile Zeitung he gives his impressions of the American industry.

"I do not doubt at all that there are a certain number of concerns in America which make more than 12,000 cars each per year," he says. "In order to ascertain this I always took into account the size of the testing room and the equipment when visiting plants. I found out by asking innocent questions that seldom more than 1 day was used in the testing of a motor and I was able by an easy calculation to see whether the figures as to the concern's output were as claimed.

"The German may learn something from the American as to the upkeep of a car, and in proportion one sees fewer cars in need of attention in America than in Germany. I often had the impression that the American finds it a sport, a pleasure, to keep motors as well as other machines in running order.

"The American, as a car builder, is less exacting than the German. I agree with the opinion of Kommerzienrat Opel when he says that we in Germany do not have to be afraid of American competition. The cheap American motor car is not good enough for the German and the good American car is expensive and at that surely not any better than a German car. Good cars can be found in America.

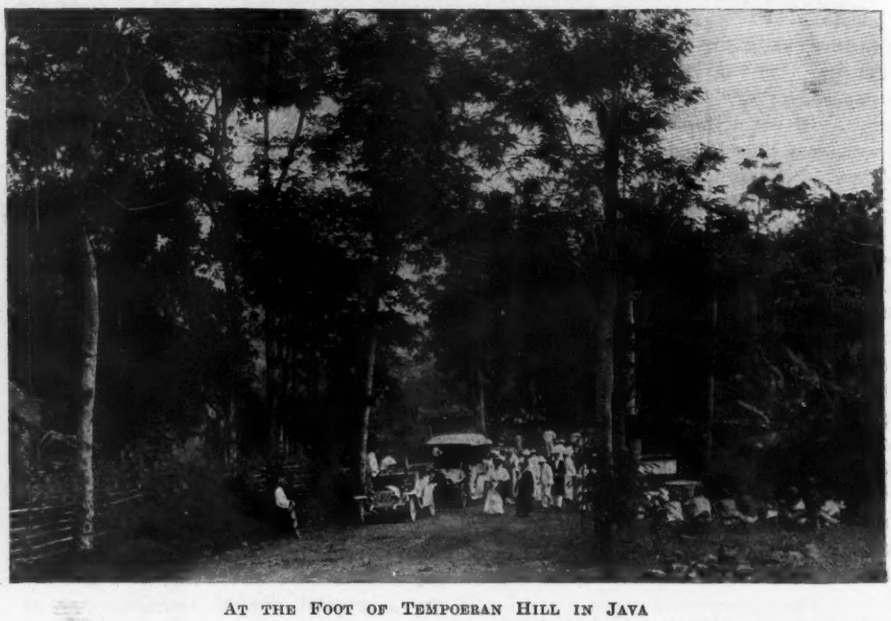
"When I saw for the first time the motor traffic in Central park, New York, I was amazed, not only on account of the enormous number of cars but because of the absolute noiselessness of most of the machines. The car traffic through the Fifth avenue entrance of Central park on a fine afternoon is a great sight. What impresses me most is the fact that only a few have chauffeurs. Certain cars, like a limousine or a landaulet cannot do without the assistance of a chauffeur, but otherwise, as an American told me, a chauffeur is kept only by such owners who fear that they might be taken themselves as chauffeurs when they drive their car. The American who sits behind the steering wheel of his attractive motor car presents in general a fine sporting picture. How different from over here, where some imagine that they are sportsmen today because yesterday they went to some old place and got an old car which had been overhauled. Another thing which impressed me was to see so often women driving cars. Many times I saw young women sitting on the running board, that is to say, on the floor just behind the radiator, where we sometimes see the chauffeur. Did it look bad? Not a bit. I even must confess that it looked good to me.

"Concerning the matter of American tools I am not of the opinion of Mr. Opel. On the contrary I am sure that we never can get along entirely without American tools. There are many special machines which are made only in America for the reason that the demand or needs here are not great enough to warrant the great expense connected with the construction of making such special machines in Germany. For instance, I think that there is not a single German concern which would care to go to the trouble of making a machine which will drill at the same time twelve cylinders, as I saw one. How many motor car manufacturers here in Germany would buy such a machine which in 10 hours drills 480 cylinders?

"With thanks I must acknowledge the readiness with which concerns permitted me to go through their plants and the extraordinary kindness shown me everywhere. One morning when I wanted to pay my bill in a hotel in a small manufacturing town of Connecticut I was informed I was a guest of the concern which I had visited the day before and with whose officers I had spent the evening."

Kommerzienrat Wilhelm Opel, the winner of the Prince Henry tour of 1909 and a member of the big Opel concern, of Russelheim, was another prominent German tradesman who visited the United States recently, to investigate its motoring conditions. Here are some of his observations.

"During the first days of my arrival I was told of concerns supposed to have an annual output of 12,000 cars. However, the nearer I came to these concerns the more the original figures shrunk. In every town where I stopped on the way to one of these plants the concern's output fell off by a thousand, and when I finally came to the place I was informed that the annual output of the concern was 4,000. There are two or three concerns which have an output of 8,000 to 10,000 cars per year, but it is not a production or an output as we Germans look upon production, because these plants make only certain parts and get from other concerns such important items as steering gears, transmissions, motors, etc. Thus, they only assemble motor cars and put their name plate on the assembled product. The German manufacturer has too great a feeling of responsibility and thinks too much of his good name to risk such things. Besides, we Germans take into consideration that our cars are put to much harder usage, must perform much more than the American cars, which are used principally for city service.



AT THE FOOT OF TEMPOERAN HILL IN JAVA

"American cars never have been able to secure a hold here in Germany. On the other hand, I know that such articles like cylinders, springs, crankshafts, in fact, parts which require quality and the manufacturing of which means high wages, are exported to the United States by us. However, in business unexpected things may always happen, and if there is an overproduction in America, which may be in 2 or 3 years, then the American makers will have to try hard and throw their goods upon the European market. But we Germans need not fear this competition. The American motor car is built too lightly and is not strong enough for our road traffic. Against German cars for which the best material is used it cannot compete."

Mr. Opel went to America 16 years ago where he learned, according to his statement, all his practical knowledge as to factory running, organization, etc. Thus 16 years later he was able to make comparisons.

"I have not been able to find anything

in the way of factory organization or running which is done differently in America than it is done here in Germany now," says Mr. Opel. "Also in business methods I did not find any radical departures since I was there before. Nothing could convince me more of the wonderful growth and development of the German industry than the fact that during my 8 weeks' stay over there I did not discover anything startling, although I visited many plants. The American workingman is rather a specialist, while the German workingman is a universalist. However, in Germany we are following the American idea because a plant having specialists as workmen is able to bring out or get out a rational production."

FUEL TEST FOR CHICAGO

Chicago, April 5—Sanction has been granted the Chicago Motor Club by Chairman Butler of the contest board of the American Automobile Association for an economy run to be held April 28 over a route which will be from Chicago to Lake Geneva by way of Half Day and returning by way of Algonquin and Elgin, a distance of approximately 200 miles. The cars will be divided into the two A. A. A. classes, one for touring cars and the other for runabouts, and in turn sub-divided into divisions according to price. The formula that will be employed will be as follows: The actual weight of the car with passengers as weighed in the time of starting will be divided by the amount of gasoline consumed in ounces, 128 ounces to the gallon, according to the graduate measure, and the car with the highest percentage will be the winner. In general the 1910 contest rules of the A. A. A. are used but there are additional supplemental regulations framed by the technical committee in the Chicago Motor Club which have been approved by Chairman Butler. The entry fee for this test will be $30 for each car, $5 of which will be returned if the car starts. The entries close at midnight Saturday, April 23, with Charles P. Root, chairman of the contest committee, 1806 Michigan avenue, Chicago.

Motoring Outlook in Java Excellent

BATAVIA, Java, Feb. 15—There are as yet but few American cars owned on this big and rich island, with its 30,000,000 inhabitants. This Dutch possession is becoming every year a better field for the exporter and it is time the American car makers who care to extend their foreign trade direct a bit of their attention to this country, which surely will some day become a great motoring land.

There are three reasons why the motor car is making fine headway in this far-away Dutch colony. In the first place the transportation facilities between all the important cities and towns are very primitive and entirely inadequate for the requirements. In the second place the roads in general are in good condition and the authorities do all they can to improve them. Finally, there is a fairly large white-man population, many of whom are in well-to-do circumstances, and ready to invest in modern transportation conveyances.

To get an idea of the trade possibilities on this island it might be recalled that the first motor car seen here arrived in 1902. During the following 12 months motor cars of a value of about $16,000 were imported. In 1904 the value of the imported cars, according to the official statistics, was $30,430; in 1905 the total reached $59,380, and in 1906, $109,606. During 1907 the motor car importers had a banner year, as the value of the cars imported reached $452,631. In 1908 the $500,000 mark was far surpassed, and it is said that the record for the year just ended will not be far from the $800,000 mark.

Who is getting the bulk of this trade? As usual, the British and German manufacturers were about the first to make their cars known and get a strong hold upon the prospective buyers. The French and Belgian cars also are to be found, but in small numbers.

The car most appropriate for this country is the four-cylinder double phaeton of from 10 to 16 horsepower, and costing not more than about 4,500 Dutch gulden, or about $2,250. It is absolutely necessary that the cars have an extra large and well-constructed fan aiding in the cooling. It would be well to have the radiator also provided with a condenser. Another most important matter is that the car must have a carbureter which will stand the effects of the great summer heat. By all means should the tires be of the best quality. As the country is very hilly it will be necessary to provide large gasoline tanks. It would not be necessary to ship cars here with bodies, inasmuch as there is a fairly large and good body-making concern in this city.

To do a successful business it would be advisable to establish an agency in one of the three leading cities, that is Batavia, Samarang or Soerabaya, or else place the agency with one of the well-known concerns already in business. The leading concerns are the following: F. J. Fuchs, Tana Abang, Batavia; Automobielenfabrik Simplex, Koningsplein O, Batavia; Vervey & Lugard, Batavia; Handelsmaatschappy Het Centrum, Batavia; Vanderlinden & Teves, Samarang; Motor Maatschappy J. F. R. Hellendoorn, Soerabaya; A. G. van Amerongen, Soerabaya.

The first reliability run promoted on the island was held a few weeks ago, having been organized by the Semarangsche Automobile Club. Included in the tour was a hill-climb. It was not a very serious affair, more in the nature of an outing than a contest.

TYPICAL ROAD IN JAVA WHICH WAS USED FOR A HILL-CLIMB

COMMERCIAL CAR TEST PLANNED

Chicago, April 5—The Chicago Automobile Club's contest board has decided to schedule for early September a commercial car contest in which it will be the aim to demonstrate to the business world the feasibility of motor transportation. While the plans only are in a tentative form at the present time, it is intended to make the test a most exacting one, including several long-distance trips to adjacent cities in which real road conditions will figure and a record of the gasoline and oil consumption will be kept as well as tire wear. A circular letter recently sent to the makers of commercial cars in this country produced such good results that the club feel confident it will be an easy matter to secure a large entry list for its fall test.

WINTON DENIES RUMOR

Cleveland, O., April 4—Rumors to the effect that the Winton Motor Carriage Co. is involved in the deal whereby it will become a part of the United States Motors Co. is positively denied by the Winton officials, who have placed emphasis upon this denial by sending telegrams to each of the Winton branches throughout the country, stating that there is no truth in the rumor whatsoever.

Discuss Problem of Saving Roads

BOSTON, MASS., April 2—Interesting, even for the outsiders, was the meeting of the Massachusetts Highway Association Thursday night, when the road problems were discussed by men who have spent years at such work. The road makers are gradually solving the problem of preventing disintegration of highways because of motor traffic.

The one surprising thing was that there was not more said about motor cars as road-destroyers, for at other meetings where highway constructors have gathered that fact was given much prominence. With the statements made by the road-makers Thursday night as a criterion it seems fair to assume that we are approaching an era of permanent roads, yes and dustless ones, too, and perhaps in time the abolition of the tax upon motor cars that goes to help maintain the highways.

Certainly to hear Superintendent John A. Pettigrew, of the Boston park department telling what fine results he had obtained at reasonable cost in keeping down dust and saving the road, it hardly is to be believed that Mayor Fitzgerald will try to keep the motor cars out of the parks. Likewise to hear what fine results were obtained from an oil and sand road down the cape—also at a reasonable figure—there is every promise that the hue and cry raised against the motor car will gradually diminish and die out.

To crown it all, to hear what good results the national government has had with experiments as told by Logan Waller Page, director of the road inquiry division of the department of agriculture, at Washington, even the road-makers were convinced that the progress made during the past few years is bringing them toward their goal, and the latter already is within sight.

Mr. Page was the principal speaker and when he finished his talk he had a series of slides shown to illustrate roads in different places. The one striking thing brought out by the slides was the fact that in Europe the people pay attention to making the sides of the highways atractive. A number of pictures of foreign roads showed pretty stretches with bushes and flowers on both sides. The slides showing our highways proved quite an indictment of our lack of appreciation for the beauty of nature. It would seem as if there were a great opportunity open to societies that are striving to replace untidy home surroundings with attractive ones to go further and tackle the roadside problem.

Mr. Page stated that the national government's first experiment in the treatment of roads was undertaken in 1900 when a stretch less than a mile was oiled, 5,000 gallons being used. It was a sand and clay road and the oil left a disagreeable odor for 5 years. In 1904 a greasy base, odorless oil was used on D street, Washington. It laid the dust but interfered with the traffic somewhat. The first scientific experiment for laying dust and binding stones was made at Jackson, Tenn., in 1905. It proved successful. An inspection of this road in 1908 showed that where not heavily traveled it was in excellent shape. As late as December, 1909, beneficial effects were noted on this road.

In the summer of 1907 experiments were conducted at Wayland, Mass., with tars for surface treatment of roads. In November of that year the road was in good condition and practically dustless. Crude oil mixtures were used on a road at Bowling Green, Ky., and it resulted in a highway as smooth and firm as a first-class asphalt city street. Calcium chloride was used in Washington in 1907 and five applications were enough for the dusty season. No water was needed.

In 1908 a new method was tried at Newton in which oil, lime and molasses were the ingredients. That same year tar and slag were tried in Alabama and both methods proved satisfactory.

Page spoke about the different methods of preventing dust and gave the results of his observations. Water was the most common but rather unsatisfactory treatment, because its effect was but temporary. Calcium chloride was not a dust preventative itself, but rather a dust-palliative. Oil emulsion with good asphaltic base has been employed to advantage on macadam roads, and it was also good on asphalt to lay the dust.

In applying various oils he said it was preferable o use them a number of times lightly than few times thickly. It is seldom advisable to apply crude oils when heating is needed. Heated material is best applied with a machine under high pressure. The oil-and-earth road is not destined to prove a success either in the east or on the Pacific coast as yet, because of climatic conditions. Mr. Page then showed the slides and among them were scenes taken at the Lowell races when cars were going at top speed. The skidding tore up the road and this was rather noticeable. Pictures were shown of other cars going at varying speeds, and practically no dust was raised by the front wheels, while there were good-sized clouds from the rear ones.

President George E. Stuart then called upon Chairman Harold Parker, of the highway commission, who told of the good results achieved with the sand and oil road on the cape. It was built 5 years ago and today it is in better shape than just after it was built. He said an experiment was made last year with an oil-gravel-asphalt combination that when finished was the most perfect road he ever had seen. He said it still looked good after the hard winter.

Parker stated that the highway commission had experimented with about everything it could get hold of and had made some 600 different chemical analyses before, while on and after use on a road, keeping records under every sort of climatic condition. Yet up to the present he was not quite satisfied just what was the best material for a highway.

ROAD RACE COURSE DISCOVERED

Chicago, April 4—The first club run of the season which was held yesterday by the Chicago Motor Club resulted in the discovery of a road race circuit at Elgin which may be used some time for a contest of this nature. The circuit was discovered by Frank Wood, manager of the local Knox branch, who resides at Elgin, and is so near Elgin that it almost is a part of it. It is located at the end of Highland avenue, and excellent transportation to it is to be had, there being a railroad station within ½ mile of where the grandstand would be built in case the course was used. The circuit is approximately 8 miles around, and there only are three turns in it, all of them wide enough to be negotiated in safety, while the stretches are wide enough in some places for three cars to run abreast. The farmers are enthusiastic over the proposition and declare that if the road race is run there they will double the width of the road on the turns and do everything possible to make the race a success. Elgin is 38 miles from Chicago, and if a race were run there in June it would be possible to get the soldiers without trouble, for at that time the annual state encampment will be held in Elgin.

BIG TROPHY FOR BADGERS

Milwaukee, Wis., April 4—The donation of a large silver trophy to be contested for annually by the motorists of Wisconsin, is announced by the Wisconsin State Automobile Association. The donor is the Milwaukee Sentinel. The trophy is to cost between $750 and $1,000. The trophy will be competed for annually in a reliability or endurance run under A. A. A. regulations, open to Wisconsin owners and dealers. The trophy will be perpetual, the winner holding it for a year. The names of winners will be inscribed on the cup. George A. West, treasurer of the Wisconsin S. A. A., has been appointed chairman of the contest committee in charge of the annual event. President M. C. Moore of the association some time ago perfected a route of 6 days' duration, which may be adopted. Some are in favor of a 3-day tour, however, and the Moore tour may be reduced. As the route now stands, it covers practically the entire state of Wisconsin and is the finest arranged route ever devised from the standpoint of roads, territory covered and general accommodations. The route is:

First day—Leave Milwaukee, passing through Waukesha, Palmyra, Whitewater, Elkhorn, Delavan, Beloit, Janesville, Monroe and make Madison the night control.

Second day—Leave Madison, passing through Sauk City, Prairie du Sac, Baraboo, Reedsburg, Lavalle, Elroy, Kendall, Ontario, Cashton, Portland, St. Joseph, and make La Crosse the night control.

Third day—Leave La Crosse, passing through Onalaska, West Salem, Sparta, Cataract, Pine Hill, Black River Falls, Merrillan, Fairchild, Augusta, Fall Creek, making Eau Claire the night control.

Fourth day—Leave Eau Claire, passing through Chippewa Falls, Cadott, Stanley, Thorp, Abbotsford, Colby, Marathon, Wausau, and make Merrill the night control.

Fifth day—Leave Merrill, passing through Antigo, Birnamwood, Elan Junction, Wittenberg, Tigerton, Caroline, Marion, Clintonville, Embarrass, Shawano, Bond, Angelica, Mill Center, Green Bay, Depere, Wrightstown, Kaukauna, Little Chute, and make Appleton the night control.

Sixth day—Leave Appleton, passing through Menasha, Neenah, Oshkosh, Black Wolf, Fond du Lac, Waupun, Beaver Dam, Juneau, Watertown, Oconomowoc, and finish at Milwaukee.

It is probable the tour will be held in July, although no date has been set.

CHICAGO CHAUFFEURS STRIKE

Chicago, April 4—Chicago taxicab drivers struck today and as a result Chicagoans who heretofore have traveled to and from the theater in motor cars or have utilized them for short business trips are obliged to use either the trolley or horse-drawn vehicles. The strike involves about 500 drivers who have been working for seven of the leading taxicab concerns in Chicago. Contrary to usual custom, they are not asking for more money. Instead they wish a renewal of their present contract, with the various companies, which expires May 1 and which calls for a guarantee of $12 a week with a 20 per cent commission on all over $60 taken each week and a stipulation that no driver shall work longer than 15 hours out of every 24. The sore spot with the drivers is the rule enforced by the companies compelling the chauffeurs to pay the repair bills when some part is broken. The drivers claim that in many cases these charges are excessive and demand a court of appeals in which such claims may be adjusted fairly to both parties concerned. The taxicab companies are affiliated with the Auto Livery Transportation Co. and also belong to the Chicago Employers' Association which has agreed to back them up in the present strike.

CHICAGO FLORAL PARADE

Chicago, April 4—The Chicago Automobile Trade Association has decided to make its floral parade May 7 an afternoon affair instead of holding it in the evening. It is planned to have at least 500 cars in the turn-out and the awards will be made by a committee of prominent society women. There will be four divisions in the parade, three prizes being awarded in each. In the first section the prize will be for the car best decorated with natural flowers; in the second division the floats will contest; in the third the electric cars; and in the fourth there will be the machines which are contesting for the prizes for the cars having the most unique decorations.

Decision In Mercedes Radiator Case

PARIS, March 24.—Recently the state court of Switzerland rendered a verdict in favor of the Daimler Moteren Gessellschaft, of Marienfelde and Unterturkheim, Germany, maker of Mercedes cars, in its suit for damages against Megevet, a manufacturer of parts and accessories, of Switzerland and France. The suit was for infringement of the Mercedes honeycomb radiator patents, the Daimler people claiming that the Megevet radiators were a copy of theirs. In a first trial, in the courts of the city of Geneva, the Mercedes concern won, but it found that the verdict of only $14,000, whereas it asked for nearly $1,400,000, was not satisfactory. Megevet, on the other hand, also appealed. The decision of the higher court allows the Daimler company $60,000, the expenses for both trials to be borne also by Megevet.

The court held, for instance, that even if as asserted by Megevet that a Mercedes radiator was seen on a car in Switzerland before the patent had been applied for in that country it would not have any bearing as the patent had been taken out in Germany, and owing to the special treaties or agreements between Switzerland and Germany, the invention was protected in Switzerland the moment the patent had been granted in Germany to the Daimler company.

It was shown to the court that Megevet had started to make the copied Mercedes radiators in 1902 and that from July, 1906, on he sold 300 from each of his two factories—Bellegarde in France and Geneva in Switzerland. In July, 1907, it was proven that 7,219 radiators were sold from the Swiss factory and 2,630 from the French plant. The first suit was started in 1904.

The Geneva court allowed $1 damages for each radiator made by Megevet, while the latter, so it was shown, had earned a profit of $11.56 on each. Megevet claimed that while he was making and selling radiators the Mercedes company did not make and sell its radiators separately, but that the radiators were made exclusively for Mercedes cars, that if the company did not sell any cars it did not sell any radiators. The Geneva court accepted this argument and it took it under consideration in making its damage allowance.

The higher court on the other hand did not accept the argument and held that the Daimler concern was entitled to recover the full profit made by Megevet, that is, $11.56 per radiator, even if the Daimler concern disposed of its radiators in another way than Megevet. But in making the claim for damages, the court held that the complainant only must ask for such damages as apply to the patent. In other words, as it was shown that Megevet's radiator and the one made by Daimler had some differences in construction, it is natural to believe that Megevet would have made a radiator even if he had not copied or imitated some features of the Mercedes radiator. For that reason the court held that the damages must apply only to the copied or imitated features and it decided to allow the Mercedes or Daimler company $4 to $5 damages for every Megevet radiator.

In conclusion the court placed the amount of damages to be paid by Megevet at $60,000, which is to cover the period of time between the start of the business and July, 1909. The decision has been received with great interest by manufacturers of motor cars in Europe.

EXPORTS AND IMPORTS

Washington, D. C., April 2—The export trade in motor cars and parts continues to grow at a very gratifying rate. The latest statistics compiled by the government show that the number of cars shipped abroad during February was 561, valued at $770,322, against 333 cars, valued at $346,967, exported during the same month of last year. The exports of cars were valued at $44,839 in February, 1909, increasing ot $113,001 in February last. During the 8 months of the fiscal year ended February, 1910, the number of cars exported was 3,429, valued at $4,566,274, together with parts valued at $808,610. For the corresponding period of 1909 the number of cars exported was 1,240, valued at $2,297,110, while the value of the parts exported was $366,245. The tables show that cars and parts were shipped to the following countries during February last: United Kingdom, $150,457; France, $31,145; Germany, $8,954; Italy, $81,093; other European countries, $15,489; British North America, $357,797; Mexico, $74,668; West Indies and Bermuda, $66,476; South America, $34,379; British East Indies, $12,914; British Australasia, $22,882; other Asia and Oceania, $10,342; Africa, $13,883; other countries, $2,844. Fifty-one cars were imported into the United States during February, the value thereof being $108,885, while in February a year ago the number imported was fifty-nine, valued at $128,190. Imports of parts rose slightly in value during these periods, the figures being $61,579 for February, 1909, and $61,960 for February last. During the 8 months of the fiscal year the number of motor cars imported increased from 1,018, valued at $1,853,442, in 1909, to 1,052, valued at $2,040,597, in 1910. Imports of parts likewise rose in value from $521,889 to $637,923 during these periods. Cars were imported from the following countries during February: United Kingdom, 3, valued at $6,730; France, 26, valued at $39,023; Germany, 9, valued at $29,907; Italy, 12, valued at $30,592; other countries, 1, valued at $2,633.

PERTINENT POINTS ABOUT PATENT LAWS

EDITOR'S NOTE—This is part III of a series of three articles on the patent situation by Warren S. Johnson, president of the Johnson Service Co., Milwaukee, Wis.

THE final outcome of a patent suit is about as nearly determined when the complainant has won in the lower court as the final outcome of the civil war was determined by the battle of Bull Run. There is nothing truer in patent cases than the old adage, "He who laughs last laughs best"; but perhaps a more modern saying and not quite so classical is that a game is never out until it is played out. The decision of the lower court is the opinion of a single judge. The opinion of the circuit court of appeals is the opinion of three judges or at least two judges out of three. As patent cases go, the chances are that the court of appeals will reverse the decision of the lower court so that when the case is won in the lower court the odds are even as to a reversal in the next court. It might be said rather that the chances are perhaps in favor of a defendant.

Winners Sometimes Caught Napping

In the lower court there is but one judge. In the court of appeals there are three judges—two of the three only are required to reverse the decision. As stated in the former article, the case cannot go to the supreme court except in very exceptional instances. The defendant has a little advantage in the upper circuit court in another way: It is natural for those who have succeeded to rest upon their laurels, and sometimes the winning side in the lower court is found napping in the upper court. While the other side can bring in no new evidence, it may employ new attorneys, and the matter may be presented to the court of appeals in a different light than in the lower court. Be it as it may, as I have said before, the chances often are that the decision of the lower court may be reversed.

Supposing, now, that the complainant wins in the court of appeals; the defendant then will be perpetually enjoined within that district and within that district only, because no court can enjoin outside of its own jurisdiction. It is of course probable that if the complainant wins and obtains a permanent injunction in a certain district that he will sue the defendant in another district. The court in that district will give him a temporary injunction against the defendant in the new district and will treat the decision of the court in the other district with great consideration.

As to any other defendant, the winning of the case in one district against a certain defendant does not involve the new defendant in a new district. It will readily be seen that he may have evidence in his defense which may be entirely new and different from what was presented by the other defendant in the first district, and, as I have said in a former article, every tub stands on its own bottom. It is quite possible that the first defendant did not conduct his case properly. There may be an abundance of facts anticipating the patent that were not discovered by the original defendant. It readily can be seen that an owner of a patent should not get a monopoly in the whole United States that he does not deserve simply because in a single case the attorneys of the defense were not shrewd enough to present the evidence that they should or in a manner that they should in one particular district. With a new defendant in a new district the whole matter will begin de novo, and it is quite possible that in this new case the patent may be declared invalid.

In other words, it is possible to have a patent declared valid in one district and invalid in another. That would seem wrong and yet in a way it is right, and it is the best that can be done under the circumstances. Of course, if the case could be carried to the supreme court of the United States that would settle it for the United States as a whole, but it would be entirely impracticable with the other cases now before that court to introduce hundreds of patent appeals. What should be instituted is a general court of appeals for patent cases. Then the matter would be adjudicated for the whole United States and settle the validity of a patent once for all. As it now stands, the winning of the case in a single court does not in any way prevent the defendant, and much less others, proceeding with their regular business. The winner of a suit in a district court and who had gotten no farther than the district court knows this, but unless he is more honorable than many complainants he tries to intimidate the public by threats. It is his legal business to notify individuals or the public as to the fact that he owns a certain patent but he has no legal or moral right to threaten or intimidate. If he proceeds in a legal and proper manner he will institute suit and let the law take its course.

Sometimes Bluffs Are Made

Owners of patents often threaten to begin suits against all infringers everywhere in the country. Now there is nothing to prevent the owner of a patent from beginning a suit against any or all infringers in any or all courts of the United States, but it is one thing to begin a suit and another thing to get a judge to hear it. If suits were brought against all infringers in all courts in the United States the whole judicial machinery of the United States would be involved in these suits alone, so the rule of the courts is, and the reader can see that it is a very just rule, that when a patent is in litigation in one district a judge in another district will not proceed with a case involving the validity of the patent while the case is pending. The complainant, if he has a suit in progress in one district, must await the outcome in that district before he can get other courts to entertain his suit. The public, therefore, need not fear a general onslaught by the owner of any patent. It costs very little to enter a suit in the United States court, and if the court will not proceed with the case it costs the defendant very little to defend it.

As to decisions of the courts, there is a very peculiar condition to be taken into consideration. Judges are human and their minds are more or less affected by the general opinion of the people in their own districts. Of course, this affect is subconscious, but nevertheless it is a potent factor. If the general opinion of the people in the district is favorable to patents the judge is more liable to lean toward that side. If the general opinion of the people of the district is opposed to patents the judge will unconsciously lean toward the other side. It long has been known that the first and second districts are the best districts in the United States to bring a patent suit because the people of New England and the other eastern states being engaged largely in manufacturing give greater weight to the value of an invention. Some of the western districts are exactly the opposite, the minds of the people having been affected by the old drive-well cases and the barb wire fence cases—the people being interested in defeating the patent rather than in sustaining it.

Method of Procedure

Now, supposing the complainant has won both in the lower court and in the court of appeals in a certain district. He gets a permanent injunction for that district and he now must begin action to collect damages. He can restrain the defendant of course in that district and for all infringements prior to that he may collect damages. A complainant may estimate his damages at a certain sum but that does not indicate that the court will estimate it at that sum. While the owner of a patent may charge any price he pleases for licenses to operate under his patent or give no licenses at all if he does not so desire, when there has been an infringement the court must decide as to what the damages are for such infringement.

It is natural for the complainant to desire all the profits that the infringer has made on his sales, but the court will give him damages no greater than it determines his patent contributed to the whole profit. Supposing a defendant sold a motor car on which the net profit was

$300 and that the complainant has a decree in his favor on a certain patent that was used by the defendant in the motor car which he sold and on which he made a profit of $300. The court will not award the owner of the patent the total profit of $300 unless that patent not only contributed to, but was the total source of such profit. Supposing that the patent was for a motor car with certain fundamental parts but the car sold had very many other things about it that made it salable. An invention of 1879 for instance, involving certain claims will be awarded damages only in proportion, as a motor car made according to that patent bears to a modern motor car of the present day which is an evolution and contains many other features that make it salable. The truth is, a motor car built according to an invention of 1879 would be absolutely unsalable at all. The chances are that the amount of damages awarded would bear a very small proportion of the $300 profit. It may be also that the owner of the patent may have licensed others for a very small sum to use his patent. The fact that he has licensed others to use his patent at a certain sum would influence the court in assessing the maximum damages as it would be hardly supposed that the court would award a greater damage than the owner had set upon his own patent, so that infringers in general cannot greatly fear the final result of a suit even if it is won by the owner of the patent.

Summary of the Case

It occurs to me that there is a great deal of misinformation or lack of information in reference to patent cases. The articles which I have written have not been intended to be technical nor to be exact in all particulars. The facts set forth are true in the main and may be summarized as follows:

1—The issuance of a patent by the patent office of the United States indicates in a very small measure the question of validity.

2—A suit begun in a certain district out of over seventy in the United States affects only that particular district.

3—The decision of the lower court in one single district is only the beginning of the battle to determine the validity of a patent.

4—The decision of the circuit court of appeals in one district in favor of the plaintiff secures for him a permanent injunction against the defendant for that district but for no other district.

5—Winning of a suit against one defendant does not win it against another as another defendant may have entirely new evidence and a second decision may reverse the first.

6—Suits must be instituted in other districts in order to secure for the patent owner permanent injunctions throughout the United States.

7—While suits may be instituted against any and all infringers or socalled infringers in any court, the courts will not proceed with the cases while the same patent is in litigation in any other court in the United States.

8—When the complainant has won his case in the courts the court must then determine the damages which he can recover.

9—These damages will be in proportion as the patent sued upon contributed to the total profits and no more.

Suits Drag in Courts

From what I have said in these articles it can be plainly seen that from the beginning of a suit until its final determination by judgment as to damages there will elapse in the course of the events years, and years, and years. A suit begun in the year 1910 against any infringer or supposed infringer of a patent expiring in 2 or 3 years could not in the course of events be determined before the patent had expired. During the progress of a suit the infringer could be enjoined temporarily but not permanently. Therefore, he could continue his manufacture, sale or use. After the patent has expired damages could be collected if the court so decrees for all violations of the patent during its existence but not longer of course, and no patent can be renewed.

Manufacturers' Communications

HORSEPOWER AND FOOT-POUNDS

Jackson, Mich.—Editor Motor Age—Few persons seem to understand the relation between horsepower and foot pounds. When the steam engine was placed upon a commercial basis by Watt and his successors it seemed entirely natural that its power should be expressed in terms of the effort of the horse, and in spite of all suggestions for new units the horsepower remains as the measure of the greatest aid to human effort which has yet been produced. The engines of today have their power expressed in terms of thousands of horses, and this power is distributed and applied very largely by means of electricity, this method permitting both a convenient distribution and unequaled facility in control and manipulation. The horsepower is expressed in terms of foot pounds, or in other words by means of the idea of lifting a weight, and it is to the lifting of weights that electrically-transmitted power has been most effectively applied.

Drivers can save gasoline when far from home or supplies and running out of the precious fluid by lowering the windshield and top if one is carried, so as to save air resistance, then run car slowly on high gear. The small throttle opening gives a small charge of gas. Leave muffler cut-out open. Coast down grades as much as possible and select smooth roadways. The result will be that where 10 miles can ordinarily be made on 1 gallon you will make 15 or more by this care.—F. A. Davis, sales manager Jackson Automobile Co.

STODDARD ADJUSTMENTS

Dayton, O.—Editor Motor Age—In Motor Age, issue March 31, in the Readers' Clearing House department, a subscriber asked "What adjustments have the Peerless, Packard, and Stoddard-Dayton on their carbureters, and how many." Motor Age replied, relative to the Stoddard-Dayton, that a double adjustment is furnished on the auxiliary air valve, and on these cars an air valve is placed on the manifold which may be controlled from the steering column or dash. While this statement is correct as far as it went, in view of the correspondent's asking "How many," we feel that the entire adjustments should have been mentioned, and, therefore, request that Motor Age permit us to give a correct answer as follows: There are four adjustments; one to regulate the height of the gasoline in the float chamber; another on the auxiliary air valve to regulate the amount of gasoline required when running at high speeds; a third to alter the auxiliary gasoline supply, while the fourth is another auxiliary air valve located on the intake manifold. —Dayton Motor Car Co.

ODD-SIZED TIRES

Akron, O.—Editor Motor Age—We noticed in Motor Age, issue March 17, page 17, a communication from J. S. H. asking about a larger tire for 32 by 3½-inch rim. It will doubtless be interesting to readers to know that we make 33 by 4-inch tires for just such rims and furnish them in regular clinchers, quick-detachable clinchers, and in quick-detachable cable base type. These special sizes have one more layer of fabric than the regular sizes for the same rims and contain about 40 per cent greater cushion of air. We make the following special sizes:

31 by 3½ regular clincher fits a 30 by 3 rim.
31 by 4 regular clincher fits a 30 by 3½ rim.
31 by 4 Q. D. clincher fits a 30 by 3½ rim.
33 by 4 regular clincher Q. D. fits a 32 by 3½ rim.
33 by 4 Clincher Q. D. cable base fits a 32 by 3½ rim.
35 by 4 Q. D. clincher fits a 34 by 3½ rim.
35 by 4½ regular clincher fits a 34 by 4 rim.
35 by 5 regular clincher fits a 34 by 4½ rim.
35 by 5 Q. D. clincher fits a 34 by 4½ rim.
37 by 5 regular clincher fits a 36 by 4½ rim.
37 by 5 Q. D. clincher fits a 36 by 4½ rim.
37 by 5½ regular clincher fits a 36 by 5 rim.
37 by 5½ Q. D. clincher fits a 36 by 5 rim.

In addition to these we are making 27 by 4½ Q. D. clincher which fits a 36 by 4-inch rim.—Firestone Tire and Rubber Co.

The Readers' Clearing House

THE VACUUM OILING SCHEME

ST. ANSGAR, IA.—Editor Motor Age—The vacuum oiler fitted to the model N Ford, mentioned in a recent communication, is reproduced herewith, the cylindrical brass tank remaining in its original position. All piping was removed and the openings for same either plugged or soldered shut. A ⅝-inch hole was drilled in the bottom of the tank directly beneath the filling plug, a brass seat A for the valve B was soldered inside a piece of 1⅛-inch copper pipe, and the latter soldered around the ⅝-inch hole. An old exhaust valve turned to ⅞-inch diameter and seated by the spring underneath shuts off the oil flow when the filling plug is removed. A hole was drilled in the rear side of the copper pipe below the valve seat and a ⅜-inch copper pipe C first fitted through the crankcase with its lower end nearly touching the bottom of the case beneath the center bearing soldered around it. Care must be taken to place the pipe at the rear to avoid the crankshaft. Owners of cars to which these have been fitted claim their engines always have the proper amount of oil, and secure between 300 and 400 miles to the gallon. On very rough roads the exhaust will be a little smoky, due to heavier feeding. This is noticeable particularly when the tank is nearly empty and will be more pronounced the higher the tank is placed above the botton of the case.—Guy B. Carroll.

CALCULATING COMPRESSION

West Chester, Pa.—Editor Motor Age—Will Motor Age give me the rule for figuring the actual compression of a cylinder; that is, a rule which takes into account not only the compression due to piston movement but also the added compression due to rise in temperature?—M.

Actual compression in the cylinder of a motor is primarily based on the fact that the atmospheric pressure in every square inch of surface exposed is 14.7 pounds, so when a cylinder is filled with mixture on the suction stroke the pressure within that cylinder is 14.7 pounds to the square inch. Before stating definitely how compression is calculated, it must be remembered that pressure of a gas, or in other words its compression, is inversely proportional to the volume of the gas. For example: If we had a cylinder 10 inches long filled with gas at atmospheric pressure and compressed it into a cylinder 5 inches long and of the same diameter, the pressure of the gas would be twice as great, that is 29.4 pounds to the square inch. If the gas in a 10-inch cylinder were compressed into one 3⅓ inches long, or one-third the size, the pressure would be three times as great, or three times 14.7 pounds. In the same way, if the gas in this cylinder were compressed into a space one-quarter the size the pressure would be four times as great; or if into a space one-fifth the size the pressure would be five times as great. This, however, is only on the assumption that the temperature remains the same throughout.

From this the compression may be readily computed as follows:

$$\text{Compression} = \frac{\text{Vol D} + \text{Vol C}}{\text{Vol C}} \times 14.7$$

Volume D = piston displacement in cubic inches.

Volume C = combustion chamber displacement in cubic inches.

In this equation when the piston displacement is known for the cylinder and the desired compression is known by solving the equation, the combustion chamber volume in cubic inches can be obtained. Regarding changes in pressure, when the temperature is increased, for every 1 degree centigrade rise in temperature there is an increase in pressure of $\frac{1}{273}$.

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

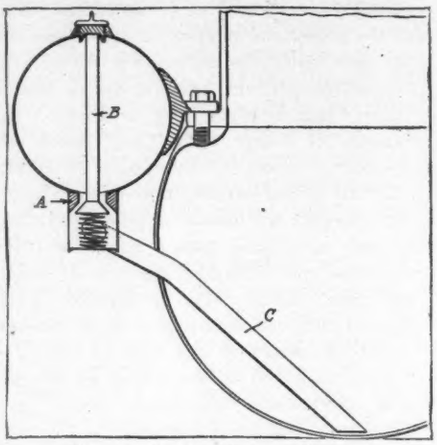


FIG. 1—VACUUM OILING SCHEME

GARAGE IDEAS

Reading, Mich.—Editor Motor Age—In Motor Age, issue March 24, A. J. More makes inquiry in regard to an inexpensive garage. Perhaps a description of one I built for myself last fall will give him, as well as others, some ideas worth following. Of course one must be governed by the number and size of the cars to be accommodated. For my Hupmobile I find that a building 12 by 18 feet gives me plenty of room. The foundation wall and floor is concrete; the wall is 8 inches thick and extends 10 inches above the floor, except for an 8-foot space in the front end where the doorway comes. It is very important not to have the floor too high—just a few feet higher than the outside surface; and from directly under the doors let it extend at least 2 feet outward with a gradual slope to the surface, then one can declutch and coast in, while, if you have a high bridge to climb with the power turned on, one is liable to make a door in the back end some time. I also have a pit located nearly in the center, 2 by 8 by 3½ feet and 3 feet deep with tile drainage, with a slight slope toward it from all four walls. As to the building, it is constructed of wood. I used 2 by 4-inch studding and rafters, then put on a cheap matched sheathing on both roof and sides, covering the whole with H. W. John-Manville Co.'s asbestos-side. This makes it fireproof on the outside and also very warm and dry. I paneled it with narrow dark green strips, both on the sides and doors, making it a very attractive building. Four windows give plenty of light. The doors swing outward and are 4 feet wide, and have a clearance of 7½ feet in height. When building the outside walls I imbedded, at equal distances, ten bolts, ½ by 9 inches, in the concrete, letting the ends extend far enough to pass through the sills which are 2 by 6 inches. This insures the building remaining on the foundation.—C. W. Abbott.

GEAR RATIO AND WHEEL SIZES

Madison, S. Dak.—Editor Motor Age—Will Motor Age through these columns answer the following?

1—If a car geared three and one-quarter to one and fitted with 32 by 3½-inch tires has the latter changed to 33 by 4, what is the resulting gear ratio?

2—What is the comparative gear ratio between a car geared three and one-quarter to one equipped with 32 by 3½-inch tires, and one geared three and one-half to one with 34 by 3½-inch tires?—Reader.

1—By gear ratio is meant the number of revolutions of the crankshaft to one of the rear wheels, consequently if no change is made in the driving pinion bevel in the rear axles, and the bevel gear on the differential with which it meshes there is no change in gear ratio when the 32 by 3½-inch tires are changed to 33 by 4-inch sizes. There is a difference, however, in that for each revolution of a 32-inch tire the car travels forward approximately 100.7 inches, whereas with a 33-inch tire it travels 103.6 inches, which means the motor every three and one-quarter turns

REVOLUTIONS PER MINUTE OF MOTOR CAR ROAD WHEELS AT DIFFERENT RATES OF SPEED

Wheel Diameters	Miles per hr.	1	2	3	4	5	6	7	8	9	10	15	20	25	30	35	40
	Ft. per minute	88	176	264	352	440	528	616	704	792	880	1320	1760	2200	2640	3080	3520
28		12	24	36	48	60	72	84	96	108	120	180	240	312	360	420	480
30		11.2	22.4	33.6	44.8	56	67.2	78.4	89.6	100.8	112	168	224	280	336	392	448
32		10.5	21	31.5	42	52.5	63	73.5	84	94.5	105	157.5	210	262.5	315	367.5	420
34		9.88	19.76	29.64	39.52	49.41	59.29	69.17	79.05	88.94	98.82	148.23	197.64	247.05	296.47	345.88	395.29
36		9.33	18.66	28	37.33	46.66	56	65.33	74.66	84	93.33	140	186.66	233.32	280	326.66	373.33
38		8.84	17.68	26.52	35.36	44.21	53.05	61.89	70.73	79.57	88.42	132.63	176.84	221.05	265.26	309.21	353.42
40		8.4	16.8	25.2	33.6	42	50.4	58.8	67.2	75.6	84	126	168	210	252	294	336
42		8	16	24	32	40	48	56	64	72	80	120	160	200	240	280	320
44		7.63	15.27	22.10	30.54	38.18	45.81	53.45	61.09	68.72	76.36	114.54	156.72	194.90	229.09	267.27	305.45

has to do this much more work, that is propel the car 3 inches farther. Each revolution of a 32-inch tire propels the car 100.7 inches, and for a 34-inch tire 106.8 inches, a difference of approximately 6 inches. In the 32-inch tire at a 3¼-to-1 ratio for each revolution of the motor the car is propelled 30.9 feet; and with 34-inch tires and 3½-to-1 ratio 30.5 feet, so that the former is a slightly higher ratio.

SPARK AND THROTTLE RELATION

Chicago, Ill. — Editor Motor Age — Through the Readers' Clearing House columns will Motor Age kindly answer the following questions:

1—Where could I get an analysis made of oil and grease to be used in a motor car and what should the best oil and grease analyze for motor use?

2—In inflating tires of various sizes is it best to depend on gauge or simply have the tires stand up round when the car is under full load?

3—When should the spark be advanced to increase speed? Should this be done before or after advancing the throttle? How should the spark be handled when reducing speed?

4—Referring to Homan's Self-Propelled Vehicles, plate 3, page 273, showing cycles of a six-cylinder engine, this diagram represents the revolution of a crankshaft for 720 degrees. Each cycle of 180 degrees is also shown, but why is the latter subdivided into three parts or 60 degrees each, or a total of twelve parts for the 720 degrees?—E. S. V.

1—For an analysis of oil and grease you may consult Armour Institute of Technology, Chicago, or almost any analytical chemist. A suitable lubricant should be of a proper consistency to feed well with the lubricating arrangements and the temperature conditions required; of such viscosity and oiliness as to reduce friction to a minimum, and contain a minimum amount of constituents prejudicial to its sustained effect.

2—Motor Age would advise the use of a gauge, because an excessive pressure is an excessive strain.

3—The spark should be advanced as the speed increases. The throttle always should be advanced first and then the spark. The spark always should be kept as far advanced as possible relative to the speed of the motor, and whenever the motor is subjected to a hard pull which slows down the motor even as the throttle is advanced, the spark lever should be retarded, and then slowly advanced as the engine picks up speed. In reducing speed the throttle should be retarded first, and when the throttle is completely retarded the spark should be retarded only enough to bring about the greatest harmony between the ignition and explosion of the gases, relative to the position of the piston in the cylinder.

4—If you will again consider the diagrams mentioned, which are reproduced in Fig. 1, you probably will find that you have associated the little diagram 2 with the diagram 3, instead of with diagram 1. Diagram 2 indicates an end view of the crankshaft S of diagram 1, showing that the throws of the crankshaft are 120 degrees, and it is in no way connected with diagram 3. In diagram 3, C indicates a compression stroke; E, an exhaust stroke; S, a suction stroke, and the shaded arcs the duration of the explosion or power strokes in the several cylinders; each cycle representing 180 degrees of crankshaft travel. This diagram is intended to show how the power impulses of a six cylinder motor overlap each other.

THE SELDEN PATENT

Bellamy, Ala.—Editor Motor Age—I have heard so much about the Selden patent that I wish Motor Age would advise me what the patent is.—A. M. Sledge.

The Selden patent was granted to George B. Selden, Rochester, N. Y., November 5, 1895. Application for it was filed May 8, 1879, and the patent number, granted in 1895, is letters patent No. 549,160. In brief, this patent deals with a hydrocarbon engine or gasoline engine of the compression type. The patent gives a fairly concise description of this engine with its valves, camshafts, etc. The important feature, however, of the patent is that the motor may be kept running but the drive-wheels remain stationary, which is made possible by interposing a clutch between the engine and the gearing which drives the wheels. This clutch is the real crux of the Selden patent. By means of this clutch the motor can be kept running with the car standing idle; the clutch can be disengaged to shift from a high to lower gear; in fact it would be impossible to operate a gasoline motor in its present stage of construction without a clutch being used, which is the feature covered in the Selden patent.

HORSEPOWER AND SPEED

Daytona, Fla.—Editor Motor Age—Through the Readers' Clearing House will Motor Age tell me the A. L. A. M. horsepower rating developed by a four-cylinder motor with cylinder sizes 5 by 5 and geared three-to-one, with 36-inch wheels and driven at 20 miles an hour. Also the horsepower developed from the same motor going 30 and 60 miles an hour respectively.—E. D. W. Rose.

The horsepower developed by a four-cylinder motor with a 5-inch bore and stroke, is 40 horsepower according to the A. L. A. M. rating. This rating is obtained by means of the standard A. L. A. M. formula $\frac{D^2 \times N}{2.5}$, the square of the diameter of the cylinder, D^2, times the number of cylinders, N, divided by the constant 2.5, which is based on a piston speed of 1,000 feet per minute. If a car travels 20 miles per hour, according to table 1, which gives the approximate number of revolutions a minute of motor car wheels at different rates of speed, the

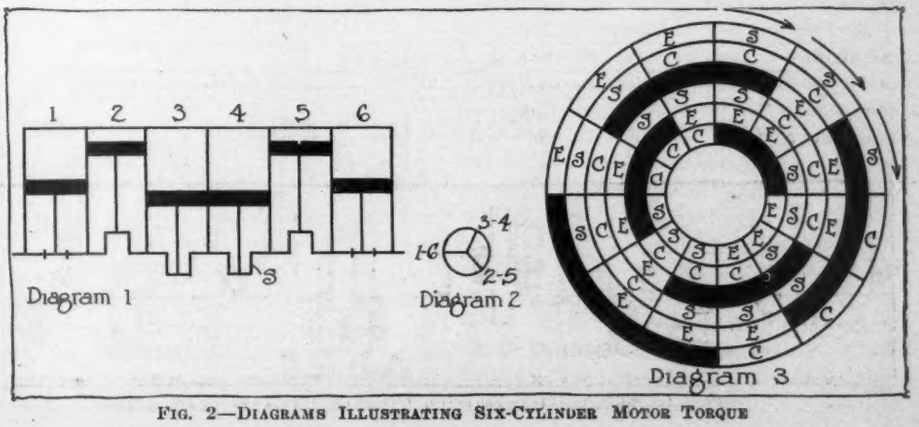


FIG. 2—DIAGRAMS ILLUSTRATING SIX-CYLINDER MOTOR TORQUE

wheels in this case being 36 inches in diameter, will make 186.66 revolutions per minute, and being geared three-to-one, the motor makes three times as many revolutions as the wheels, or approximately 560 revolutions per minute. With a 5-inch stroke and two strokes per revolution, 560 revolutions of the motor give a piston speed of $5 \times 2 \times 560$, or 5,600 inches. Therefore, if a motor with a 5-inch bore gives 40 horsepower at 1,000 feet, or 12,000 inches piston speed, at 5,600 inches piston speed it will develop $\frac{5600}{12000}$, or $\frac{7}{15} \times 40$ horsepower, which is 18.66 horsepower. In the same way, at 30 miles per hour the wheels make 280 revolutions per minute, the motor 840 revolutions per minute; giving a piston speed of 8400 inches, and $\frac{8400}{12000}$, or $\frac{7}{10} \times 40$ horsepower, equals 28 horsepower. At 60 miles per hour the piston speed is twice that of 30 miles, and as the horsepower increases in proportion to piston speed the horsepower developed is 56 horsepower.

MAKING A TURNTABLE

Flood River, Ore.—Editor Motor Age—Will Motor Age give me plans for a turn bridge to be above the floor, the car to run in about 4 inches above the floor and turn around on a center, the frame being bridged only a few inches wider than the car. I wish to use it in place of a round turntable with a pit. It will look like a hayrack with a center strong enough to hold a 2,600-pound Marmon. Being a reader of Motor Age, I take this liberty.—W. F. Laraway.

In Fig. 3, plans are shown of a turntable which may meet with your requirements. It consists of a platform made almost entirely of wood, which is supported at each corner on a castor or roller, and has a pivotal bearing in the center. A plan view of the idea is shown in section 2; Fig. 3, weight-supporting side-members T being about 4 by 6 or 8-inch timbers, as long as is required. The cross-boards are 2 or 3 inches thick, perhaps 8 or 10 inches wide, and about 66 inches long. As indicated in section 3, Fig. 4, to the inner and lower edge of the side timbers T, strips of angle-iron B, extending

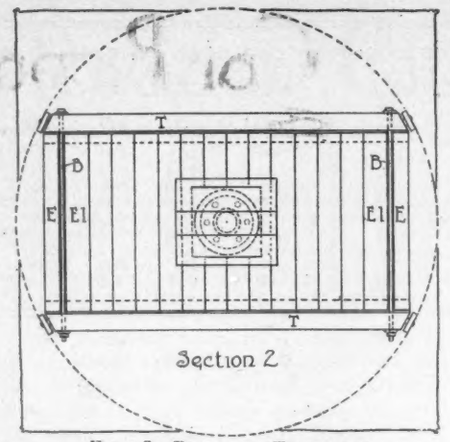


FIG. 3—PLAN OF TURNTABLE

along its entire length, are attached, which support the cross-boards. When the parts which go to make up the platform are ready to assemble, the side timbers are laid parallel and directly opposite each other, so the side boards may be dropped in their places, then the assembly is securely and rigidly bound together by drawing the two side members together by means of two long rod bolts B, Fig. 3, which may be placed between the two end boards E and EI at either end. The pivotal arrangement is shown in section I; Fig. 4, the stationary portion of the bearing S, consists of a ring of hard wood, which is securely fastened to the floor; and the revolving portion, or pivot P, is comprised of a short piece of iron pipe, of large diameter, screwed into a flange which is secured in a box-like recess formed in the middle of the platform. If this pipe and flange pivot is turned down a trifle in a lathe and accurately fitted in the wooden ring, the bearings thus obtained, when properly lubricated with a hard grease, should give very satisfactory service. In operation, the entire weight of the car and platform is supported on the rollers, which may be attached to the ends of the side members, as illustrated in section 4; an angle plate A is attached to the ends of the timbers. This plate is of heavy section, and has a threaded hole in the center of its vertical section into which the stub-shaft, that supports the roller, is tightly screwed. The threaded end of the stub-shaft is much longer than just the portion which passes through the plate, so that, when screwed into place, it fastens itself into a hole of slightly smaller diameter, previously drilled into the end of the timber. The hole should be of smaller diameter so that the end of the stub-shaft screws tightly into it. This greatly increases the rigidity of the stub-shaft. A platform constructed in this manner will be about an inch from the floor and may be easily mounted, that is, a car should have no difficulty in running up onto it. If you would prefer to mount the platform upon casters, as shown in section 5, the platform would be raised 5 or 6 inches above the floor, the box-like pivot support can be eliminated, the pivot attached direct to the under side of the center floor boards, and the construction simplified to this extent. With the platform so high from the floor, however, a means would be necessary for mounting it with a car; and a suggestion for providing this means is given in section 6; the end boards E being hinged to the binding rod or bolt B, and allowed to be raised or lowered as desired. Hooks H, attached to the end of the side members, and used in connection with a pin X extending from the end boards, are provided to hold the end board up from the floor when the platform is being revolved.

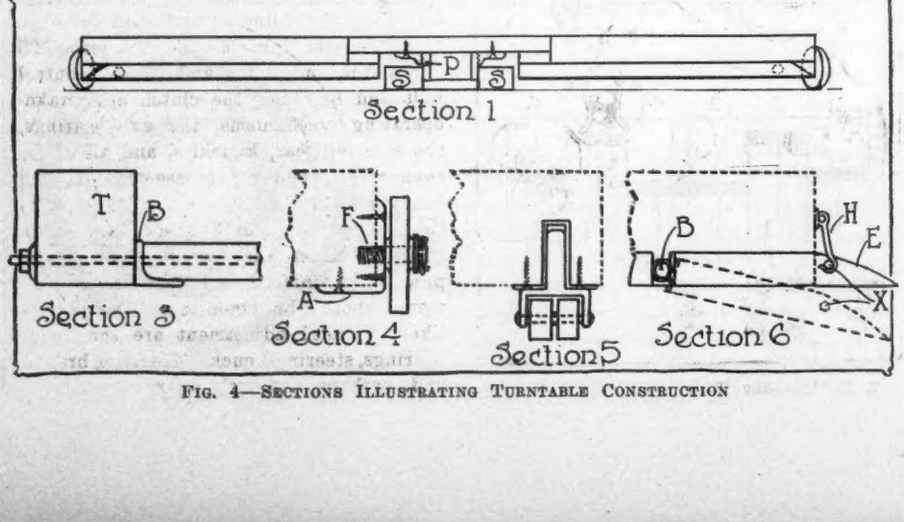


FIG. 4—SECTIONS ILLUSTRATING TURNTABLE CONSTRUCTION

TOP FOR RUMBLE SEAT

Reading, Pa.—Editor Motor Age—I noticed in Motor Age, March 17 issue, page 15, a request from Mr. La Tulip for a top to cover the rumble seat, and send herewith a photograph of such a top, which illustration appeared on page 18, Motor Age, March 31. This is simply a rear extension to the front or usual top. One vertical bow supports the rear end, while the front end buttons on the top of the rear of the usual top. A horizontal brace at each side stretches the top after the front is buttoned. The extension is easily removed.

I fear that J. L. B., of Oil City, Pa., does not have the right idea as to differential gears. For straightaway going there is no advantage is having a differential. In fact, it is rather a disadvantage because, as usually made, it permits the slipping or spinning wheel to take all the motion of the engine and the other wheel to cease driving. If both wheels are driven positively the one in the air cannot spin faster than the one which is driving, so the car continues its even course and the tires are not cut by striking the ground when the up wheel comes down again. The ratchet drives turn the inside wheel in turning a curve, but they do not drive the outer wheel faster. It simply overruns because of the pull of the steering. The proper device drives the outer wheel in turning the corner, and the only way in sight to do this is to release the inner wheel by loosening a clutch connected with the steering. I have used such a device very successfully for a couple of years on my buggyauts.—Charles E. Duryea.

The Motor Car Repair Shop

Hints for the Amateur

NOW that spring is here, and Jack Frost has retired to the far north, the anti-freezing solution should be thoroughly cleaned out of the cooling system, and replaced with pure water. The best way to clean out a radiator is to drain it entirely, then refill with a solution of washing soda and hot water, and let the motor run for several minutes. The solution then should be drained off into a receptacle, and if convenient the radiator should be removed, turned upside down and the solution run through it in the opposite direction in which it generally flows. It then should be rinsed out with clear warm water and replaced upon the car. When in place, it is well to rinse out the whole system again by allowing the motor to run with clear water in the system, then draining it off, after which it may be permanently refilled with pure water. It also is well to examine the hose connections while the radiator is off, for the anti-freezing solution used may have had a detrimental action upon them.

Substitutes for Switch Plugs

Almost every motorist will agree that the part of a motor car which is most often lost, mislaid or stolen, is the switch-plug. A few suggestions, therefore, in regard to the construction of the switch, the operation of the plug, and what to do in case a switch-plug is not on hand when desired, may be appreciated. Most of the switches in which a plug is used are constructed somewhat similar to the one shown in Fig. I, with a plug resembling the one indicated by the letter P, which is jammed between two contact springs S, the groove A serving to hold the plug more securely in place. Should a plug of this kind be wanting, any suitable object that will maintain contact with the two spring-contacts S, will serve the purpose of the plug; a split cotter-pin, for instance, or a screw or nail, or a flat key and the like.

In Fig. 2, another type of switch is shown. The plug for this type, the end of which is shown in the upper right hand corner of the illustration, has two flat surfaces F, so that it conforms to the shape of a socket in the bushing, to which the contact lever L is secured. The groove A provides a grip for the retainer springs A1, which form the ground connection of the switch, and which also are designed to prevent the plug from dropping out of the socket. In operation the plug G is pushed into place, then turned so that the contact-lever L is brought into connection with either of the contacts L1 or L2, as desired, one of which generally completes the magneto circuit, and the other the battery circuit. In this type of switch, anything that will enable the operator to turn

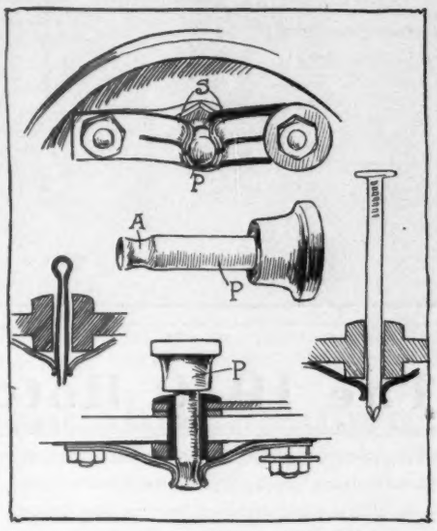


FIG. 1—IGNITION SWITCH, PLUG SUBSTITUTES

the contact-lever L, in the desired direction, and at the same time make connection between the springs A1, will serve the purpose of the regular switch-plug G. Owing to pin P, which passes diagonally across the bottom of the socket, a small screw-driver, a small flat key or something of that sort, will serve very well to turn the lever L, and if at the same time the article makes connection with the ground or retainer springs A1, satisfactory results will be obtained. If nothing of this sort is on hand, however, the cover of the switch may be removed by removing two screws, when the lever L may be shoved onto the contact desired, with the finger; then the cover may be replaced and a cotter-pin, nail, or some such article used to make connection between the springs A1 and the bushing to which the lever L

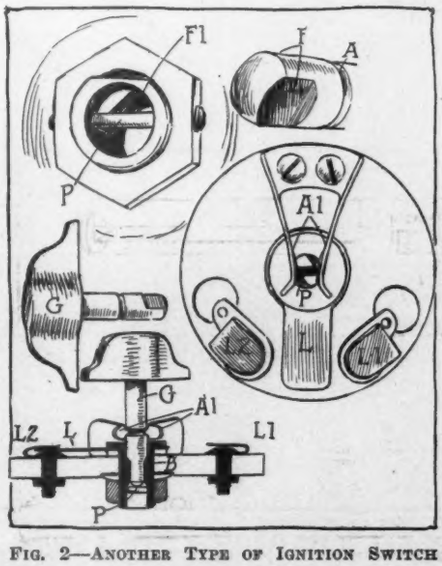


FIG. 2—ANOTHER TYPE OF IGNITION SWITCH

is attached, in a manner similar to that shown in Fig. 1, except that the substitute plug must pass through the springs A1 and also touch the bushing carrying lever L.

Reverse the Current Occasionally

It is claimed that if the current of a battery and coil ignition system is reversed occasionally, the result of this practice is distinctly good for the platinum contacts of the trembler. It reduces the wear and tear and maintains the adjustment of the trembler much longer than by continually passing the current in the same direction through the coil. The reason for this is that each time the current circuit is broken between the blade and screw a minute particle of platinum on the blade is volatilized and is carried across the gap and deposited on the contact screw platinum. Therefore, by reversing the direction of the current a considerable proportion of the platinum is transferred back to the contact on the blade, so that a kind of automatic leveling up of the surfaces goes on.

Spring-Cleaning the Car

There are many cars now in use which do not require a thorough overhauling every year, but every one, especially those which have been laid up for a few months during the winter season, should undergo a spring cleaning before it is entered into service for the following summer and winter seasons. This spring-cleaning should comprise: first, a thorough cleaning of all mud, grease and rust from the external portions of the chassis; second, the removal of all oil and grease from the interior of motor, gearset, universal-joints, rear-axle and wheels, followed by a thorough flushing out of these parts with kerosene; third, the refilling of these parts with a fresh supply of the required amount of a superior grade of oil or grease; fourth, the removal of carbon from the cylinders either by scraping or the use of some carbon-remover, followed by a thorough flushing out with kerosene, and the injection of about a tablespoonful of cylinder oil; fifth, the oiling of outboard bearings of the motor, including the fan, pushrods, carbureter, magneto and timer control rods and bearings, the clutch and brake-operating mechanisms, the axle-bearings, the steering-gear, knuckles, and all of its connections, and all grease-cups on the steering-gear, about the motor, the clutch, the universals, axles and spring shackles refilled. After the cleaning and oiling process is finished, all external adjustments should be inspected. Those most likely to need adjustment are the wheel bearings, steering-knuckle bearings, brakes, and, perhaps, the carbureter.

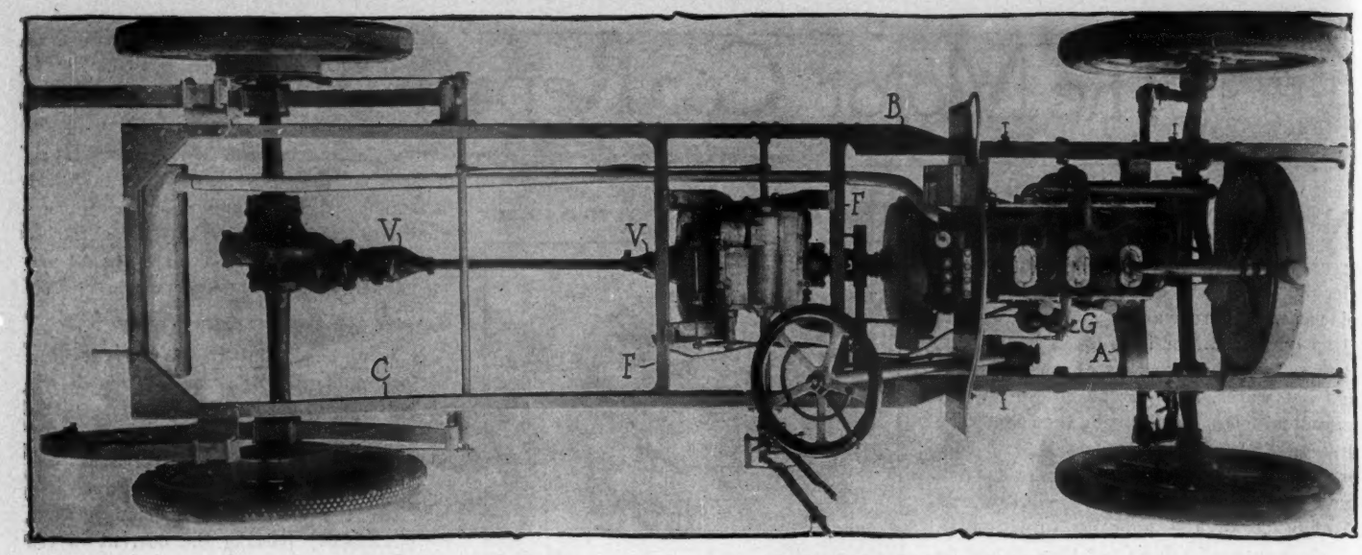


FIG. 1—SHOWING THE GENERAL LAYOUT OF THE 1910 HOTCHKISS MODEL T CHASSIS

The 1910 Hotchkiss Model T

THE Hotchkiss Import Co., New York, has announced its model T Hotchkiss car for 1910, which is illustrated herewith, and which is a four-cylinder type with en bloc casting, the cylinder dimensions being 3¾-inch bore and 4½-inch stroke, giving a formula rating of 22.5 horsepower. This model T chassis is a representative Hotchkiss construction, the concern using en bloc castings in its small sizes, but having the cylinders cast in pairs on larger models. This model T is made with a wheel-base measuring 119 inches, so bodies suitable for touring and landaulet purposes can be added.

In Fig. 1 the general layout of this chassis appears, showing the motor suspended direct from the side members of the main frame through aluminum arms A which are formed integrally with the crankcase as Fig. 4 also will show. The mainframe, of nickel steel, is bottle-necked at the dash, but has the flanges at B particularly wide at this point. Owing to the use of three-quarter elliptic springs, the frame is raised in front of the rear axle at the point C. The transmission is a four-speed selective set carried amidship on two cross pieces F, this method of support eliminating submembers in the frame. It will be noted that both the motor and transmission are supported at four points; that between the motor and gearset is a universal joint, and in the propellorshaft are two universal joints V, no torsion rod being used, and that the drive of the rear axle is transmitted to the frame through the rear springs.

Clean Cut Chassis Construction

In Fig. 3, an under view of the chassis, the clean-cut nature of the construction appears in several respects, one being the covering D, which protects the gearset brake from mud, this being a construction which is receiving considerable attention on European cars. This also suggests the fact that on many European makes today the gearset brake in the rear of the gearbox, as shown in Fig. 1, is in use still, although in America the tendency has been on shaft-drive cars, to place both sets of brakes on the rear wheel. In Fig. 3 also appears the webbing W used in conjunction with the crankcase, this longitudinal web being for the purpose of strengthening the aluminum construction. Also not to be overlooked is the integral bed plate M on which the magneto is carried, this bed plate being low, as shown in Fig. 4, so that the top of the magneto does not infringe on the space for removing the valve springs.

As Fig. 4 illustrates, the Hotchkiss motor, as are the majority of the en bloc engines, is of the L type, having intake and exhaust valves on the left side, with the exhaust manifold connecting at the point X, the manifold being a corporate part of the valve offset. Although an L type casting is used, the carburetor is carried on the right side at G, as Fig. 1 shows, and a short manifold unites with the cylinder casting. This motor is of the three-bearing crankshaft type, all three bearings being plain. The Hotchkiss

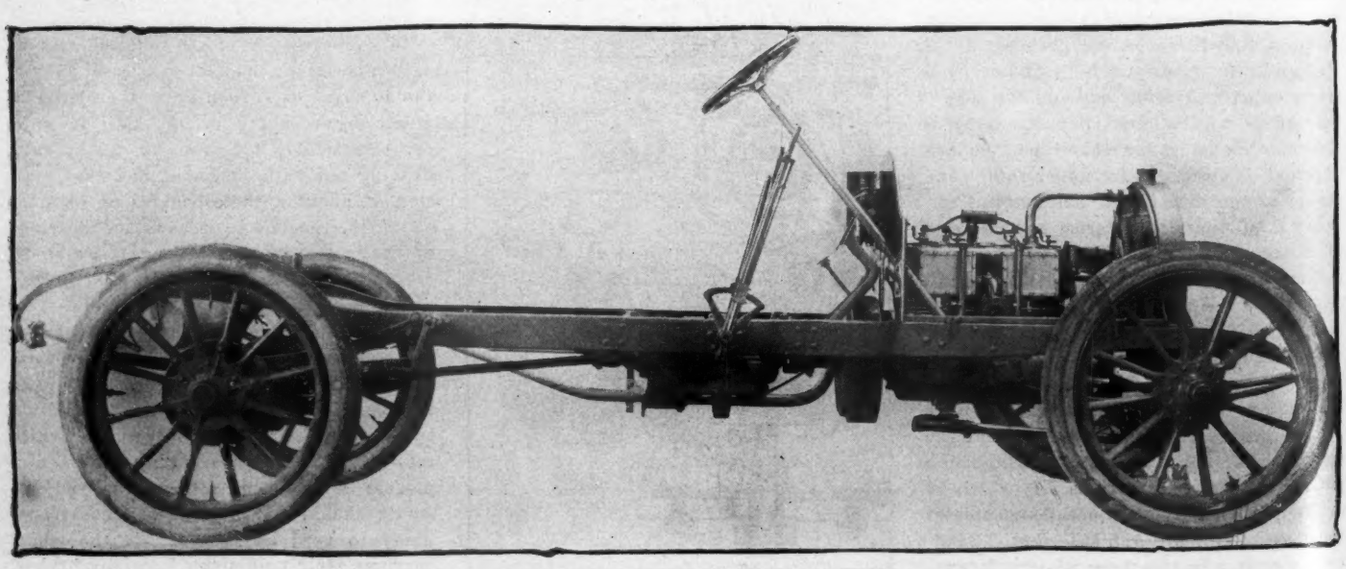


FIG. 2—A SIDE VIEW OF THE HOTCHKISS MODEL T CHASSIS FOR 1910

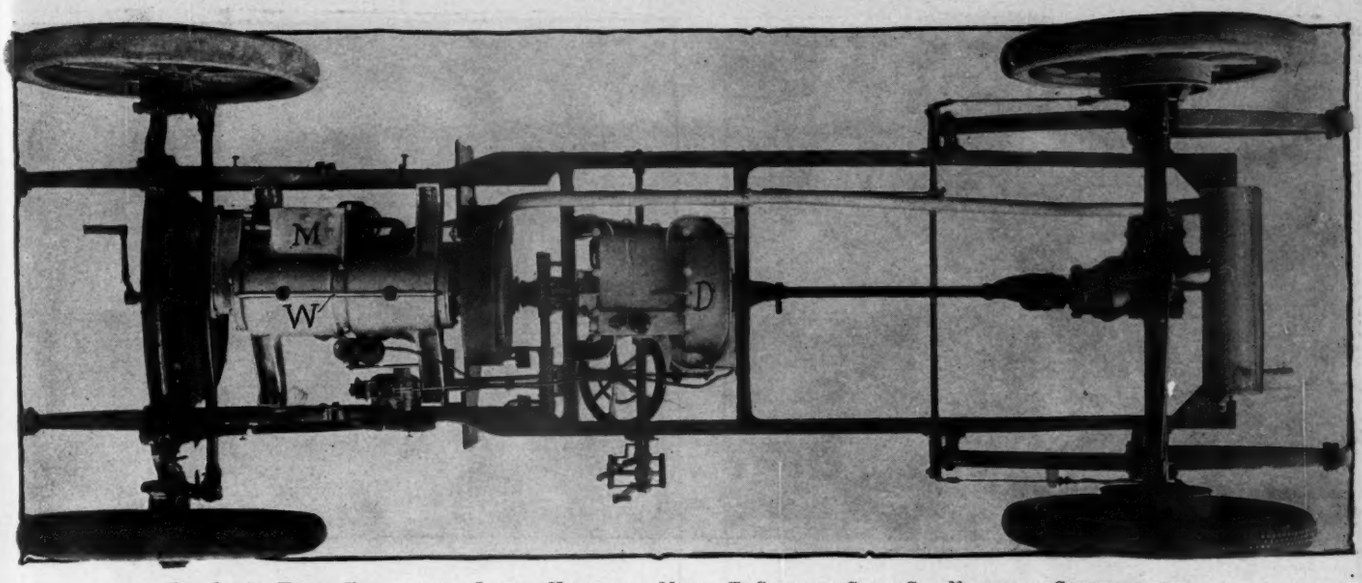


FIG. 3—AN UNDER VIEW OF THE LATEST HOTCHKISS MODEL T, SHOWING CLEAR-CUT NATURE OF CONSTRUCTION

Has Many Commendable Features

car was one of the earliest exponents of the ball-bearing crankshaft, but for the last couple of seasons the plain-bearing type has been used. In all other parts of the car ball-bearings are used, including the gearset, front wheels, rear axle, and steering gear. In spite of using the plain bearings, and employing three of them for the crankshaft, the crankcase remains a one-piece aluminum casting, the crankshaft being inserted through end plates, one of which is shown at P, Fig. 4. The timing gears, as well as the gears driving the magneto, are entirely inclosed in the forward compartment K, and at the front of this compartment is a centrifugal water pump as well as a pulley for driving the ball-bearing fan.

Gearset Ball-Bearing

The Hotchkiss gearset, Fig. 5, is of ball-bearing construction throughout, and is designed to give four forward variations. Formed as a corporate unit is the service brake SD which already has been referred to, as well as the hood or apron for protecting this brake from mud. This gearset is designed along horizontal lines, the main and countershaft being side by side. The mainshaft on which the sliding gears operate is a squared member, and the shifter rods are inclosed entirely within the housing. In front of the gearset is a leather-faced cone clutch provided with a locking device, making it impossible to change gears with the clutch engaged.

The general construction of the Hotchkiss rear axle is shown in Fig. 6, in which the housing portion is a four-part design, comprising axle sleeves S with flanges S1 on their inner ends, by which they bolt to the differential housing H, this housing is made in upper and lower halves, the upper one removed from the illustration disclosing as it does the differential gear and driving pinion. Ball bearings are used not only for supporting the differential, but also the shaft carrying the pinion P.

In Fig. 7 is shown the expanding type of brake used on the rear axle. The carrier K supports the expanding members N and N1, which are pivoted to the carrier and at their other end are united through an adjustable separator S with turnbuckle T for adjustment. The brake connection is with the lever L. A long coil spring serves to disengage the brake and prevent dragging. In connection with these brakes the adjustments of them is worthy of note. To make the adjustment the operator has to take up the floor board when the adjustment, as illustrated in Fig. 9, appears. In this T is a turnbuckle, connecting the brake rods R through right and left-hand threads. Secured to the turn-buckle is a hinged locker L which, in its down position, prevents any turning of the turn-buckle, but when raised, as shown by the dotted lines, leaves it free for altering the adjustment.

Lubricating Spring Rods

On Hotchkiss cars special care has been devoted to lubricating the spring rods,

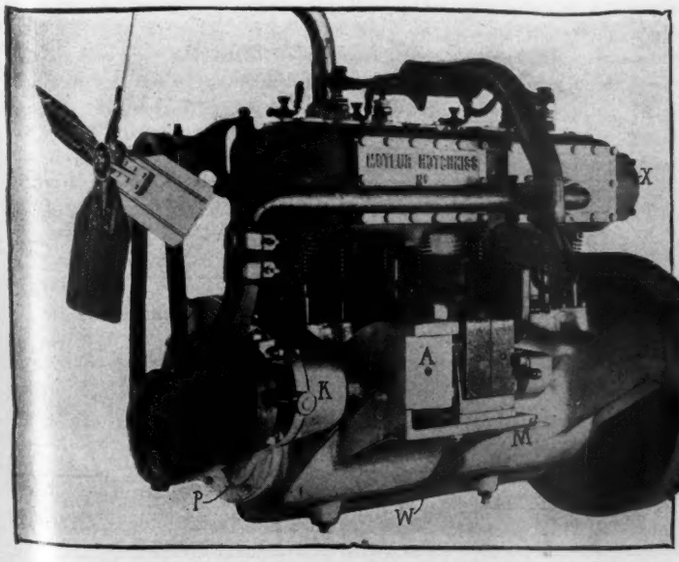


FIG. 4—SHOWING THE L TYPE, EN BLOC HOTCHKISS MOTOR

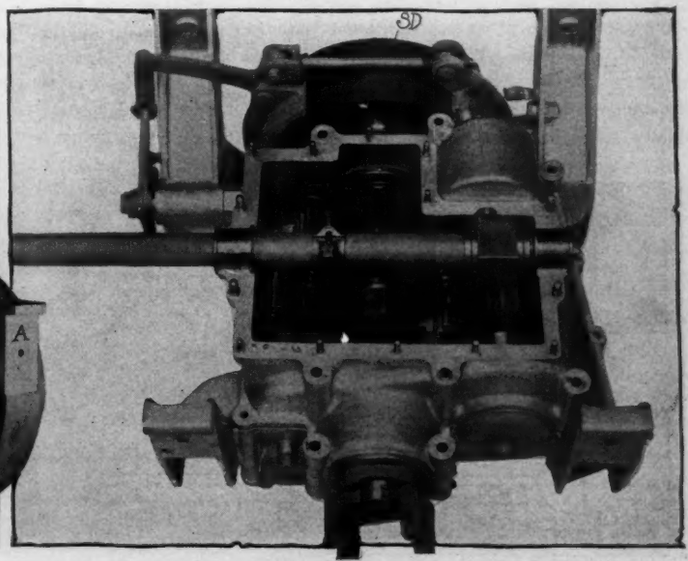


FIG. 5—THE HOTCHKISS GEARSET AND SERVICE BRAKE ARRANGEMENT

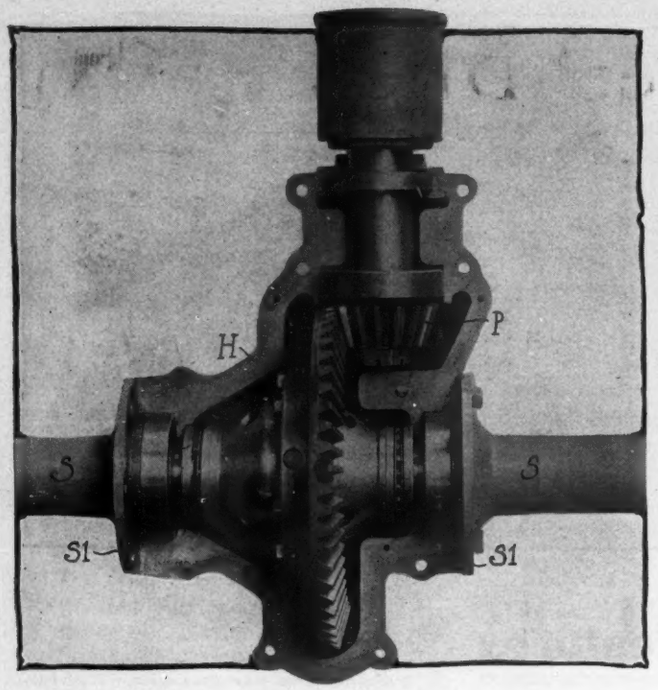


FIG. 6—BEVEL DRIVING GEARS OF HOTCHKISS REAR AXLE

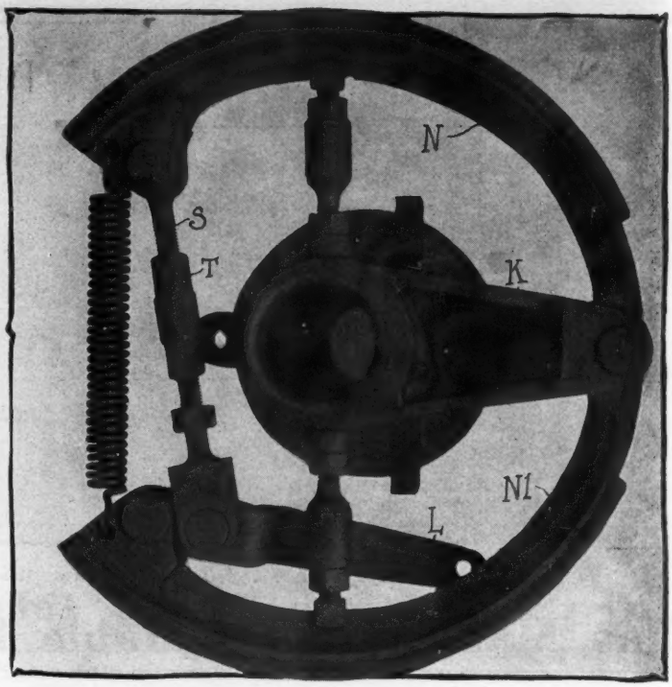


FIG. 7—TYPE OF EXPANDING BRAKES ON HOTCHKISS REAR AXLE

each spring bolt having a grease cup fitted to it. The interior of the bolt B, Fig. 8, is bored out, the same as a crankshaft is drilled for oiling the bearings. The grease cup G is compactly attached to the end of the bolt and a slot S cut in the bolt for conveying the lubricant to the exit E, whence it is liberated, there being three of these exits, as shown in the sectional illustration of the bolt, in which F represents the bored out center communicating as it does with the interior of the grease cup G. In this illustration A represents the plunger of the grease cup.

In addition to this model T, the Hotchkiss Import Co. handles a model Z which is similar in all respects to model T excepting that the motor is smaller, having a bore of 3⅛ inches and a stroke of 4¼ inches, giving a rating of 15.2 horsepower. This car is made with a short wheelbase, 109½ inches, and is intended mostly for city use. In addition to these two models are three others which differ from those of last year in that a few changes, such as longer wheelbase and greater accessibility, have been added.

Motor Car Literature

The post-card fad has been adopted by the Waverley company, calling attention to its electric vehicles.

"Leaves from a Motorist's Log Book" is the subject and title of an attractive booklet issued by the Studebaker Automobile Co., which is the log of a 3,980-mile tour in a Studebaker through France, Spain and Italy. Incidents and scenes on the trip are pleasingly described. A map of the route is included, the subject of duties and taxes receives attention, and an itemized statement of the expenses in connection with the shipping of the car from New York to Havre and return is furnished. Forming a border across the top of each descriptive page is an illustration of a view of the interesting foreign scenes en route.

"Automobile Engineering and Operating" is the title of a twenty-four-page pamphlet from the Dyke's Correspondence School of Motoring, St. Louis, Mo., calling attention to its correspondence method of motor instruction.

The Columbus Red Book is the title of a twenty-four-page catalog featuring the Columbus electrics, "the car supreme," as it is styled by the Columbus Buggy Co.

The first annual reliability touring contest of the Tampa Automobile Club, Tampa, Fla., which took place in November, 1909, has been brought to the attention of the motoring public through the medium of an official book published by the contest board of the Tampa Automobile Club. This book gives the list of the officers of the club, officials of the tour, the deed of gift, complete rules governing the run, and a day-by-day itineray and mileage, as well as maps.

"The Greatest Engine Test on Record" is the title of a most interesting book issued by the Daimler Co., England. It is a story of the test of the Daimler engine made by the Royal Automobile Club, and in which test the Daimler company own the Dewar trophy. A fac-similie of the certificates awarded by the club are shown in connection with the report, as well as many other interesting illustrations of this test.

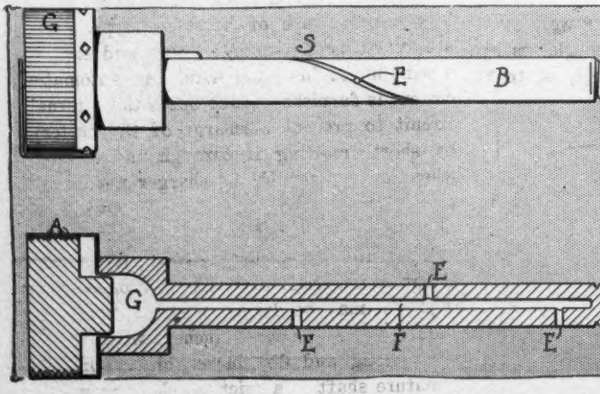


FIG. 8—SHOWING HOTCHKISS METHOD OF LUBRICATING SPRING BOLTS

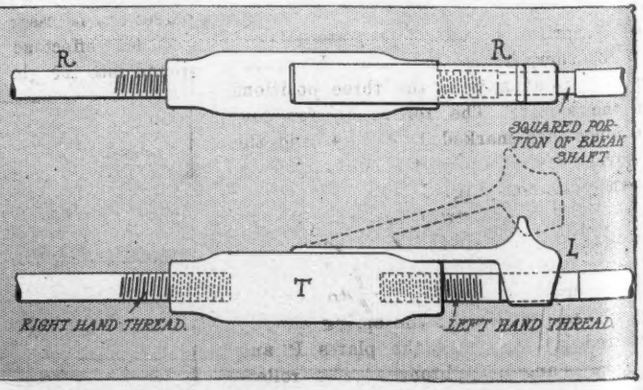


FIG. 9—SHOWING MEANS FOR ADJUSTING HOTCHKISS BRAKES

Development Briefs

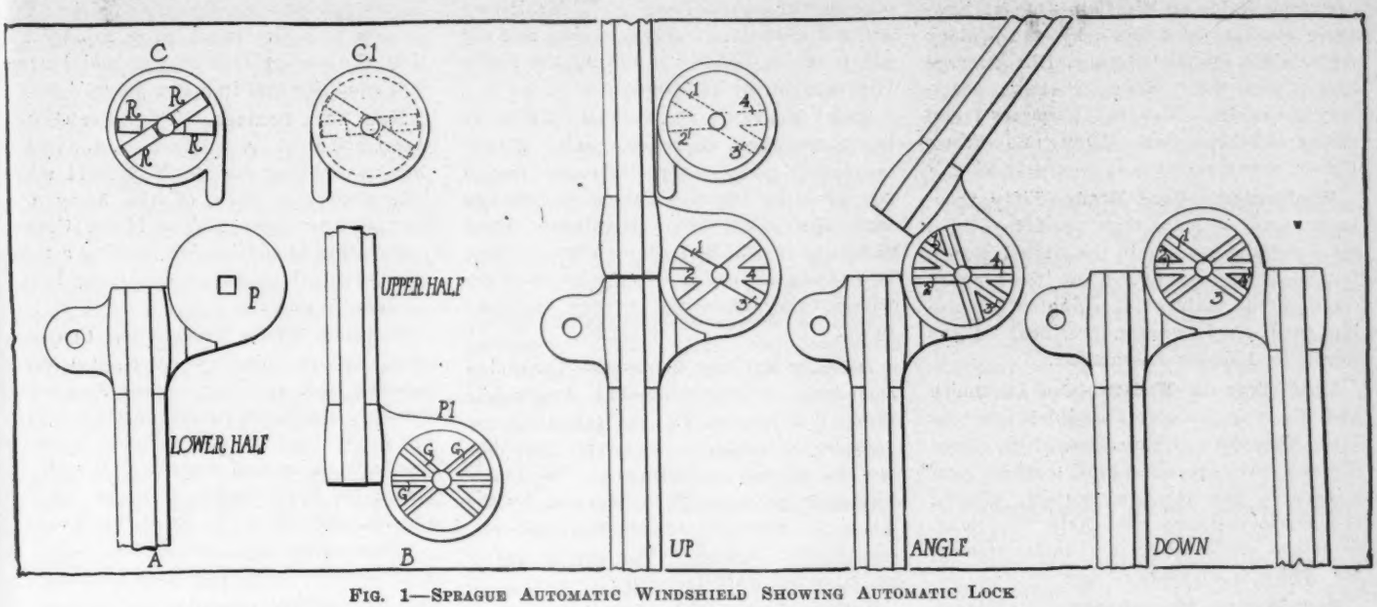


FIG. 1—SPRAGUE AUTOMATIC WINDSHIELD SHOWING AUTOMATIC LOCK

Sprague Automatic Windshield

THE Sprague Umbrella Co., Norwalk, O., has brought out since the first of the year its automatic windshield, which has two up positions, namely, the vertical and the angle at which the upper half is canted 45 degrees rearward from the vertical. In this automatic shield the upper half is automatically locked in the vertical angle, and down positions by a series of rollers located in the grooves between disks on the respective halves, which arrangement is shown in Fig. 1. In this illustration part C shows the four rollers R which rest in grooves of little more than half their thickness, and are packed in graphite to insure lubrication. These rollers are contained in a cup which fits between the plates P and P1 on the lower and upper halves of the shield. Part A shows the lower portion of the frame with a flat plate P; and part B shows the upper half of the frame with a raised plate P1 in which are three radially placed V-shaped slots G, which accommodate the rollers R on the different positions of the shield. The cup, part C, goes over the raised plate P1, which plate is $\frac{3}{16}$-inch thick. A strong spring, pressing the plates P and P1 together, holds the rollers R in the grooves G at any of the three positions of the shield. The rollers R, for convenience, are marked 1, 2, 3, 4, and the grooves they occupy in the cup, angle and down positions, Fig. 1, are indicted in three of these illustrations, so that when changing the shield from one position to another it is simply a matter of pushing the rollers from one groove to another against the tension of the spring already referred to. Both of the plates P and P1 are manganese bronze. The rollers have been used for locking purposes in order that after having been used for months there is no danger of wear with consequent looseness between the locking disks P and P1.

The Leaknogas Preparation

The Leaknogas Manufacturers, Geddes, S. D., manufacture a thick adhesive liquid, known as Leaknogas, which is claimed to be useful to apply to leaky threads in a gasoline system or to leaky bearings. It is claimed that this liquid will not dissolve in gasoline. It is applied by saturating a cloth or cord bandage with it and wrapping it over the connection.

Cook's Prescription Goggles

The Iowa Optical Co., New London, Ia., is marketing a unique type of goggle this season, the most important feature in which is that plano glass is used—by this being meant that there is no distortion of the object seen if the eye is turned in or out in order to see the objects at the side. The curvature of the glass is the same as that of the cornea of the eye. A still further important feature of these goggles is that any prescription needed is ground into them; that is, should a person's eyes be such that glasses are necessary for ordinary work, the same lens effect as used in these glasses is ground into the glass of the goggle, so that it will not be necessary to use glasses when wearing the goggle. The only framework in connection with these glasses is a nose bridge, to which each of the glasses is hinged. With this construction the usual chain or other connecter across the nose is eliminated, and the vision at that point not interfered with. These goggles are made in two sizes, large and medium, both of which are face-fitting. When ordering these a small wire is furnished by which the contour of the nose is taken, and the glasses are shaped to conform to the face. Not using a framework around the glass reduces the weight and increases the circuit of vision. The inventor of these glasses, Dr. C. E. Cook, has had them on the market for several seasons, using them for shooting and hunting purposes. The sweeping curve of the lens conforms to the natural outline of the eye, so that the pupil of the eye is in the center of the lens.

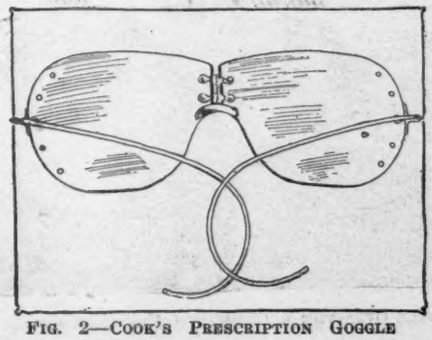


FIG. 2—COOK'S PRESCRIPTION GOGGLE

Perfection Battery Charger

The Economy Mfg. Co., Pittsburg, Pa., has announced its Perfection battery-charger, which, in brief, is a generator of electricity designed along the magneto style. The magnets are of horseshoe type. The armature has a laminated core and carries a winding of insulated wire. An automatic cut-out is furnished which opens the external circuit to prevent discharge of the battery by short-circuiting it through the charger when idle, or should the charger not be up to the proper generating speed. Owing to this cut-out arrangement it is claimed it is not possible to injure the battery. The armature is carried on phosphor bronze bearings and may be driven in either direction. This charger is 4½ inches wide, 10¾ inches long and 6½ inches high. On the armature shaft is a friction wheel by which it may be driven from the flywheel.

From the

PORTAGE Road Nearly Ready—The state portage road from Big Eddy to the Dalles, Ore., is nearing completion, $70,000 having been expended on this highway.

Quincy Holds an Election—Officers have been elected as follows by the Quincy Automobile Club of Quincy, Ill.: George Stahl, president; Henry Fosgate, secretary; Charles Nichols, treasurer, and Henry Dayton, Bert Plank and Frank Fisher, vice-presidents.

Washington's Good Roads—Fifty thousand miles, or more than one-fifth of the total railroad mileage in the United States, is the aggregate length of the county roads in the state of Washington, according to J. C. Lawrence, president of the State Good Roads Association.

Long Tour in Hudson—Coe D. Smith and his wife have just completed a tour from New York city to Tampa, Fla., in a Hudson car, traveling 1,650 miles over mountains and through swamps, making the entire distance with only two punctures and not a bit of mechanical trouble. Mr. Smith is 65 years of age.

New Way to Make Roads—The Oregon Good Roads Association is considering a new plan for road-building. The rock bottoms of the old highways are being smoothed over, then crushed rock is added and over this crude oil is poured and finished with a screening of oil and fine crushed rock. This is rolled down hard, the oil permeating the crushed rock and binding the surface together, keeping it from slipping and preventing dust.

Road Fame for Maxwell—On a wager that he could drive his car from Philadelphia to Johnstown and return, R. M. Brown, of Bryn Mawr, Pa., earned the distinction of being the first to take a motor car across the Alleghenies in March. At the top of the Allegheny mountains snow drifts 10 feet high were encountered and in many instances traction was secured by placing numerous tree stumps on the road after digging through the drifts and in plowing through mud axle deep. Mr. Brown did not encounter a single mishap and did not raise the hood once during the entire trip to make an adjustment.

New Kentucky Law—The Kentucky legislature have enacted a state license law which gives reciprocity to the motorists of other states which have complied with their own law. Heretofore when motoring in the Blue Grass state, owners have been compelled to take out licenses within every municipality they happened to be.

Dates Do Not Suit Columbus—The racing committee of the Columbus Automobile Club of Columbus, O., has taken up the question of holding a meet some time during the summer in Columbus. The tentative dates given the Columbus club by the A. A. A. were not satisfactory and correspondence is now being carried on to get more satisfactory dates.

Guthrie Center Club—The Guthrie Center Automobile Club of Guthrie Center, Ia., has organized with these officers: President, E. L. Bower; vice-president, T. J. Foster; secretary, C. H. Fryor; treasurer, C. T. Harney. The club will send a delegation to the Des Moines meeting to endeavor to have run through Guthrie Center the river road which is being advocated.

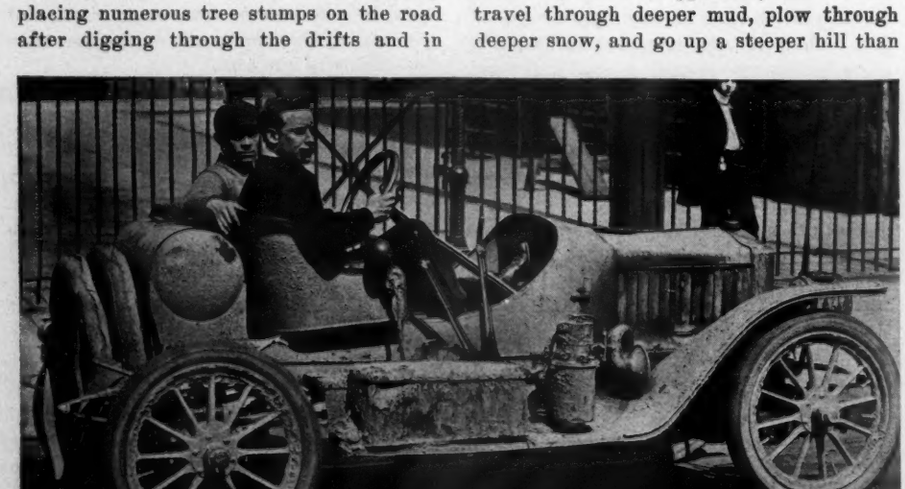
Praise for Motor Fire Wagons—Mayor Marshall of Columbus, O., has vetoed an ordinance adopted by the city council to build a regulation fire engine house in the Hill Top district. In his veto he said: "Fire chiefs all over the country are unanimously in favor of motor fire apparatus. They say that under all conditions the motor apparatus is more reliable than horse-drawn apparatus, that it can travel through deeper mud, plow through deeper snow, and go up a steeper hill than horses can draw such heavy vehicles; that it gets to a fire much more rapidly and that the saving in cost and maintenance will equal its cost in a few years."

New York Contests—The Motor Contest Association of New York announces a 2-day reliability run for May 10-11 which will take the place of the 3-day tour around New Jersey. The Motor Contest Association is considering running a 2-day road carnival at Riverhead, Long Island, on June 24 and 25.

Cheyenne Wants Racing—The Cheyenne Motor Club at Cheyenne, Wyo., at a recent meeting took up plans for reviving motor racing. The meet of last August was a big success and the club believes it should be made an annual event. The club declared for improvement of roads and will support any movement along this line.

Members for Buffalo Club—Seventy-five new members have just been accepted by the membership committee of the Automobile Club of Buffalo. According to present plans an effort will be made to raise the total membership, now 1,899, up to more than 2,000 by May 1. Several of the main roads out of Buffalo will be closed for repairs this summer. As fast as these roads are closed the club will post road signs showing the necessary detours.

Hazardous Trip—From Saratoga Springs, N. Y., to San Francisco on a pleasure jaunt, through the bottomless mud of Louisiana—plowing through the swamps which no other motor car had ever crossed—lost in the Arizona and New Mexico deserts, into Old Mexico and up the coast—that's the remarkable trip just completed by Walter H. Hanson and his wife in a 30-60 horsepower Stearns touring car. At Phoenix, Hanson was warned not to attempt to cross the desert at this season of the year. On the first day out both Mr. and Mrs. Hanson were charmed with the desert. They fared well until reaching Ehrenburg, on the Colorado river. Here some delay was occasioned by the Indians, who were not prepared to ferry the motorists over the river. Luckily for the Hansons the car was well stocked with provisions, for there is only enough at Ehrenburg for the few Indians who spend the winter there. Then came along a big sandstorm and for a day and a night the tourists were lost on the desert somewhere between Ehrenburg and Chuckawalla. The wind tore the flaps from the side of the machine and sand penetrated every part of the mechanism. Using the big car as a wind break, the tourists went into camp without knowing where they were. It was impossible to see further. On the following morning the storm had abated sufficiently to allow the tourists to go on. The car, however, was driven far out of the



R. M. Brown, Who Drove Maxwell Over the Alleghenies

Four Winds

regular track and it was not until dark that Mecca was reached with less than ½ gallon of gasoline in the tank. At present the Hansons are touring in California before leaving for the east.

Club Buying Chief a Car—A recommendation has been sent to the common council of Buffalo recommending that a motor car be purchased for the chief of police by the Buffalo Automobile Club. Heretofore the police department has depended upon the club to furnish a car in a case of emergency.

Portlanders Make Plans—Preparations are being laid for one of the busiest years that the Portland Automobile Club of Portland, Ore., has ever had. The plans laid by the club include the building of a new club house, the holding of the annual road races in June, the Lombard tour shortly after, the increasing of the club membership from the present 500 to 1,000 if possible, and the establishment of a permanent office.

Non-Motor Stop Run—In a 24 hour non-motor stop test in Omaha a Moon car, handled by the Sweet-Edwards Co., ran for 23 hours and 15 minutes, covering 479 miles, when a tire blew out. Up to that time the car had been running continuously. Most of the time was spent on the down town streets, an average speed of 20.8 miles per hour being maintained. Thirty gallons of gasoline were consumed, an average of 15.9 miles per gallon, and 6 quarts of oil, an average of 79.8 miles per quart.

Otoe Club Formed—The Otoe County Motor Club has been organized at Nebraska City, Neb., with these officers: President, R. A. Duff; vice-president, John Markel; treasurer, Harry Rolfe; directors, Ed West, Dunbar; F. J. Coddingson, Syracuse; C. A. Sweet, Jr., Palmyra; Herman Hauptmann, Julian; Roy Marshall, Douglas; E. A. Duff and Bert Smalley, Nebraska City. The principal object of the club is the promotion of good roads. The club will have an endurance run in July for the Duff trophy.

Stopping the Scorchers—Officials of Hyattsville, Md., have put the ban on motor car speeding, with the result that many motorists have been arrested the past week and fined from $5 to $10 and costs. For some time the speeding of motorists has made the town almost uninhabitable by the dust raised. Finally, the mayor and common council passed several orders and regulations relative to speeding through the town and on the Bladensburg pike. Officers have been placed along the routes in citizens' clothes and whenever they see motorists coming at a rapid rate they wave a red flag. The drivers of the machines, thinking that they are about to go over a precipice, or are in some other danger, come to a sudden stop. They are then placed under arrest and taken to the lockup. The speed limit is 12 miles an hour.

Club at Menard—The Menard County Automobile Club, at a meeting held in Petersburg, Ill., elected the following officials: President, E. E. Brass; vice-president, I. R. Abbott; secretary, J. Colby Beekman, and trasurer, G. E. Nelson.

Owners Contributing—Each of the 500 owners of Wichita, Kas., will contribute $10 to furnish funds to build 3 miles of improved road extending into the country west on Douglas avenue. This will be the first piece of improved road in the county. Mayor C. E. Davidson is at the head of the movement to improve the highways near Wichita.

Big March for Ohio—Reports for the month of March show that 5,842 owners secured licenses, paying in $28,708. Manufacturers and dealers to the number of 108 registered, while 700 chauffeurs secured licenses. The total revenue of the department was $31,660. The department has now issued 17,500 licenses since the first of the year. March of this year was the best month in the history of the department.

Doctors Are Privileged—Physicians now have the right of way with their motor cars on all the thoroughfares of Baltimore, the same as fire apparatus, police patrols and ambulances. They are allowed to speed to sick bed calls, to the aid of injured workmen and the like without being halted by the police, while street cars and wagons must make room for them. In order to distinguish a doctor's car from those of other individuals, the police department has provided each physician with a sign about 5 inches square, bearing a red cross on a white field. These signs are put in a conspicuous place on the front of the machine and to the left.

Law Not Enforced—L. A. Alcock, attorney for the state highway department of Ohio, declares that if the Wertz road law was enforced in the Buckeye state the revenue for the improvement of roads would be increased $3,000,000. The Wertz law provides that men between the ages of 21 and 55 must give 2 days' work annually for the improvement of roads or pay $3 for the work.

Spokane Show Profitable—While the attendance at the first show held in Spokane, Wash., during the past week was not as large as had been anticipated, the show contained its reward for the dealers and exhibitors, all of whom sold machines as a direct result. The show this year was a private enterprise. Plans are now afoot for the holding of the show next year under the auspices of the Spokane Automobile Dealers' Association.

Famous Driver Killed—Hubert LeBlon, who drove a Thomas in the 1906 Vanderbilt cup race, running second to Tracy in the eliminating trial and finishing eighth in the final, was killed last Saturday, when an aeroplane in which he was making a flight dashed into a pile of rocks at San Sebastian, Spain. LeBlon was circling the royal palace and had reached a height of 140 feet when he had engine trouble. He tried to glide back to the starting shed, but the aeroplane turned on him and dropped onto the rocks.

Home for Buffalo Club—The board of directors of the Automobile Club of Buffalo has appointed the following committee to arrange for the new club house that is to be built for the club: Charles Clifton, chairman; E. R. Thomas, E. H. Butler, Donald McKay and M. M. Wall. The committee has been given power to act. It will buy a site that has been selected about 15 miles from Buffalo and supervise the erection of a suitable club house, which should be completed by July 4. About $30,000 will be expended. The site is 120 acres in area.

JOE GARDHAM IN CHALMERS GLIDDEN PATHFINDER WHICH STARTS MONDAY

Among the Makers

INCREASES STOCK—The Swinehart Tire and Rubber Co. has filed an amendment to its charter increasing the capital stock from $200,000 to $400,000.

Many Use Firestones—The Firestone company claims that out of 144 commercial motor vehicles exhibited at New York, Chicago and Boston, 43 per cent of the total used Firestone side-wire tires.

M. & W. Making Millimeter Sizes—Morgan & Wright are now furnishing both nobby tread and plain tread tires in millimeter sizes. The millimeter tires are made in sizes from 760 by 100 to 935 by 135.

Igniter Company Expands—The Briggs & Stratton Co., Milwaukee, Wis., has taken possession of a large floor in a fireproof building at the corner of Milwaukee and Buffalo streets and has put in an equipment of machine tools.

Opening in Green Bay—Green Bay, Wis., will have a new agency and garage concern. Dr. W. H. Vosburgh, of Cooperstown, and C. F. Bonin have started the erection of a building near the Benin machine shops for this purpose. The lines have not been closed as yet.

Representing Kilgore—George E. Loveland has been appointed the representative for the state of Pennsylvania for the Kilgore shock absorbers, with headquarters at 107 Reily street, Harrisburg. Mr. Loveland will have under him some twenty-five salesmen, distributed in different parts of the state for the sale and attaching of Kilgores.

Buy Badger Rubber Plant—The Badger Rubber Co. of Mineral Point, Wis., which was thrown into bankruptcy, has been purchased at bankrupt's sale by L. A. Ross, R. G. White and G. A. Graham of Mineral Point, for $5,765. The company is being reorganized as the Ross Rubber Mfg. Co. and will be considerably enlarged. G. A. Graham is general manager.

Studebaker Policy—While no official announcement has been made by the Studebakers, it seems to be the policy of the company to quietly buy out the interests of appointed E-M-F agents in the larger cities, transferring the agencies to the regular Studebaker branches. Such action has been taken in Chicago, Milwaukee, Louisville and Columbus, and it is said similar changes are planned elsewhere.

New Franklin Machinery—Three pieces of machinery which in the aggregate will weigh many tons are to be added to the equipment of the factory of the H. H. Franklin Mfg. Co. of Syracuse. They are two large presses and a pair of squaring shears. On account of their weight they will be housed in a special building, for which concrete foundations are being laid. The larger of the presses is 11 feet 5 inches high and 14 feet 6 inches long, and it weighs about 25 tons. The other is 9 feet 2 inches high and 8 feet 2 inches long. Both will be used for pressing out such body stampings as doors, underbodies, seat sides and the like. The squaring shears will prepare the metal for the presses.

Bowser Men Switch—A. T. Stata has been transferred to Chicago to be manager of the office in that city for S. F. Bowser & Co. He will be succeeded in Minneapolis by L. P. Murray as division superintendent for the northwest district and W. M. Kennedy is to be manager of the office.

Fire at Hartford—Fire in the garage of the Capitol City Auto Co. of Hartford, Conn., caused a loss of about $15,000 Saturday evening. The concern operates a number of Mitchell taxicabs. There were about twenty-five cars in the garage and by hard work these were gotten on to the street.

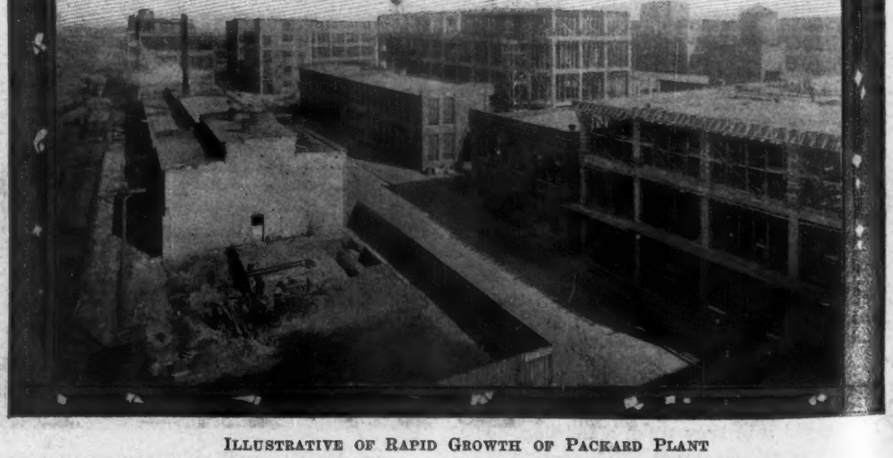
Putting Up New Building—The Garage Equipment Co., at present located at 398 Florida street, Milwaukee, has broken ground at Eleventh and National avenue, Milwaukee, for a new plant to cover an area of 150 by 150 feet, which will be four stories high, with a separate foundry building in addition.

Angola Concern Reorganizes—The Universal Tire Protector Co., of Angola, Ind., has been reorganized with a capital stock of $30,000, fully paid, the officers being S. C. Wolfe, president; E. C. Croxton, vice-president; J. R. Nyce, secretary, and W. W. Love, treasurer. A substantial building has been erected and a full equipment of suitable tools has been installed, including a battery of six automatic riveting machines, heavy punch press, forming and bending machines, lathes, drill press shapers, and also a sherrardizing plant to treat the metal parts to prevent rusting. All dies are made on the premises, and also leather-working machinery is included. A large stationary gasoline engine furnishes both power and current for electric light.

General Motors' Dividend—Announcement is made from the New York offices of the General Motors Co. of the declaration of a dividend of 3½ per cent on the preferred stock of that company, which was paid April 1. This is the third semi-annual dividend which has been paid on General Motors preferred.

Change in Quaker Concern—The growth of the business of the Olds-Oakland Co., of Philadelphia, Pa., has been so rapid that new capital has been added, and a change made in the personnel of the company. While Fred C. Van Derhoff still retains the presidency and Ward Odell continues as secretary, William M. Brownback of Bryn Mawr has been installed as vice-president and manager and John H. Brownback as treasurer.

New Garages in Portland—Seven garages costing between $20,000 and $100,000 each occupied by Portland, Ore., agencies present a strong testimonial to the extent to which the motor car business has grown during the past 2 years. Last week no fewer than three new garages were opened, the largest being the garage of the White Motor Car Co., a three-story reinforced concrete structure costing $100,000. The other garages are the Buick and the Auburn. The White garage is a three-story building covering a quarter of a block. The ground floor is given up to the salesrooms, offices and supply department and show room. In the basement space is reserved for the live storage of seventy-five cars. The Northwest Buick Co. is now occupying its new garage, which covers a full lot and is two stories in height. The Auburn Motor Car Co. is the third company to move into new quarters the past week. The garage has been hurried to completion owing to the cramped



ILLUSTRATIVE OF RAPID GROWTH OF PACKARD PLANT

quarters in which the company had been forced to do business. Other large garages of recent construction in Portland are those of the Studebaker, H. L. Keats Automobile Co., Covey Motor Car Co. and the Barnes Automobile Co., Mitchell agents.

Changes on Chicago's Row—H. E. Halbert, handling the Grout in Chicago, has taken possession of the store at 1407 Michigan avenue which was vacated last week by the Speedwell company, which has moved into its new building at 2411 Michigan avenue. The Chicago Pneumatic Tool Co., handling commercial wagons, has opened at 1337 Michigan avenue.

Barkman a Sales Manager—A. B. Barkman, who has been associated with the Maxwell-Briscoe interests since 1906, and who is one of that company's district managers, has been appointed sales manager of the Maxwell organization. Mr. Barkman is one of the many who graduated into the motor industry from the ranks of the bicycle pioneers; he was, successively, manager of the Victor bicycle department of A. G. Spalding & Brothers, sales manager for the Spalding bicycle, and secretary and treasurer of the Bridgeport Motor Co., before he joined the Maxwell forces, in 1906.

Packard Growth—The growth of the Packard Motor Car Co., Detroit, Mich., which has been referred to time and again in these pages, has once more attained phenomenal extent, so that at present the floor space aggregates 32.75 acres and affords manufacturing facilities for 5,600 employes. Two illustrations on these pages show the present activity which consists of four-story concrete construction, which soon will be completed and utilized for the 1911 manufacturing. In 1904 the Packard plant consisted of little over 2 acres of floor space—to be accurate, 98,000 square feet. Since that time not a week has passed without additions being under way. Most of the additions will be utilized for a body-building department. In addition to these illustrated a section is being added to the power house, and ground already has been broken for other departments. A large addition for the commercial manufacturing department is looked for.

and Dealers

Quits Tires for Cars—Ralph P. Dowse, manager of the G & J Tire Co.'s Detroit branch, has resigned, having in conjunction with L. H. Christian taken over the southwestern representation of the Car Makers' Selling Co., and will in the future handle the product of the factories producing the Anhut, De Tamble and Cutting motor cars. The new company will operate from Kansas City.

Building Truck Plant—The Schurmeier Motor Car Co. of Minneapolis, manufacturing the Schurmeier trucks, is planning to build just across the line, dividing St. Paul and Minneapolis, in St. Paul. The land and plant will cost about $65,000; the building will be ready in 30 days and in 4 months the first lot of twenty-five cars will be out. The Schurmeier is made in 1, 2 and 3-ton truck sizes.

Kisselkar Development—In order to provide more room for the motor car factory, the Hartford Plow Co., a concern which contributed to the foundation of the Kissel Motor Car Co. of Hartford, Wis., and is now subsidiary to the big motor car manufacturer, has been sold to the David Bradley Mfg. Co. of Bradley, Ill. The machinery, stock and equipment is now being shipped to Bradley, Ill. All of the employes of the Hartford plow works will remain as employes of the Kissel company. The transaction gives the Kissel Motor Car Co. almost double its present floor space and marks the beginning of exclusive production of motor cars by an industry established 40 years ago to produce farm machinery, etc. A brass and aluminum foundry and a drop forging plant are already being arranged in the former plow works plant.

Handling Extra Parts—The Autoparts Co. of Detroit now has extra parts for de Luxe, Northern, Wayne and Bloomstrom cars, having but recently closed the de Luxe deal.

Law Makes a Change—Fred A. Law, formerly superintendent of the Columbia Motor Car Co, has accepted a position as chief engineer with the New Departure Co.'s motor car department.

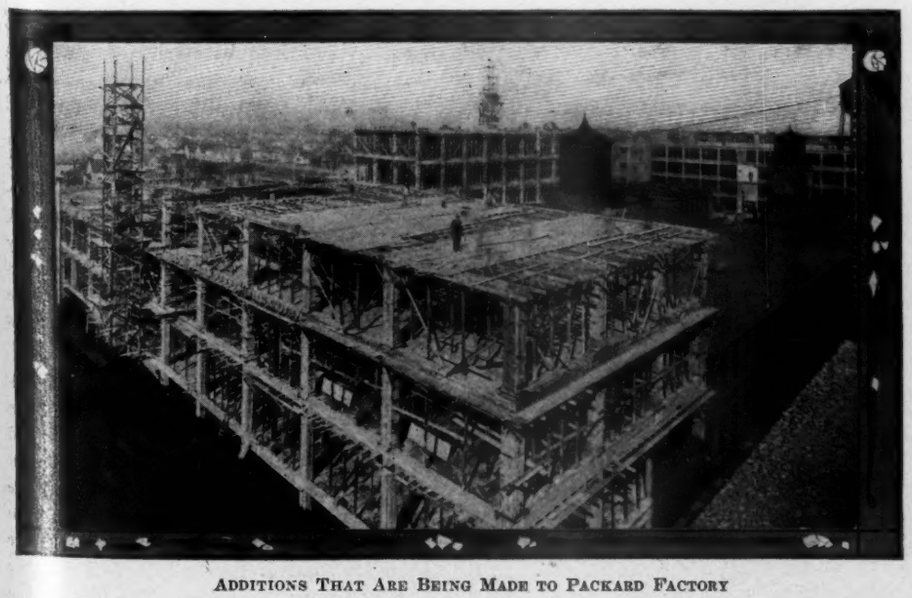
Doubles Its Space—The Vestal Motor Car Co., of Pittsburg, which started business in the Rittenhouse block on North Highland avenue several months ago, is doubling its former quarters. It handles the Stevens-Duryea.

Heinze Handling Trade Direct—The Heinze Electric Co. of Lowell, Mass., announces a discontinuance of its agency arrangement with the Hibbard Engineering Co. of Detroit. Henceforth this business will be handled directly from the factory.

Banquet for DeLisser—Vice-President and General Sales Manager Horace DeLisser, of the United States Motor Co, was the guest of honor recently at a dinner tendered him by branch managers, salesmen, and officials, of the Ajax-Grieb Rubber Co., at Delmonico's, New York. Sharing the honors with Mr. DeLisser was William G. Grieb, who has succeeded the former as president of the Ajax concern.

Country Club Opened — Philadelphia newspapermen and three-score Premier owners were the guests of the Motor Co. of that city last Saturday afternoon, on the occasion of the opening of the Premier Country Club at Valley Forge. An incident of the afternoon was the pre-prandial victory of the scribes over the Motor Co. employees on the diamond. Nearly 100 guests sat down to luncheon at the country club.

Tracy's Windshield Idea—Joseph Tracy has equipped his Chalmers 30 with something radically new in the way of a wind and rain shield. This shield consists of a rubber covering closely fitted on the dash and extending almost to the level of the eyes of the driver, being supported by an arch on the seats. Mr. Tracy claims that this wind and rain shield keeps one absolutely dry even in a severe rain storm, despite the fact that the driver is not covered above. The efficiency of the shield is said to be due to an air current created by the movement of the car which carries both wind and rain from the driver's head. It is claimed that this air current has enough force to enable one literally to ride between the drops.



ADDITIONS THAT ARE BEING MADE TO PACKARD FACTORY

Recent Incorporations

Chicago—Lozier Sales Co., capital stock, $100,000; to manufacture motor cars and supplies. Incorporators, James Levy, F. C. Gillette, Eugene H. Garnett.

Detroit, Mich.—Cass Motor Truck Co., capital stock, $300,000. Incorporators, John I. Turnbull, George G. Epstein, F. W. Ferguson, Alexander M. Spater.

Minneapolis, Minn.—Electric Vehicle Co., capital stock, $20,000; to manufacture, repair, purchase, sell and deal in motor cars, parts and supplies, equipment, etc. Incorporators, W. S. Hathway, B. E. Stimson, E. B. Stimson.

Connersville, Ind.—Indiana Lamp Co., capital stock, $10,000; to manufacture lamps. Incorporators, E. W. Austed, G. W. Austed, A. M. Austed, H. E. Butcher and Paul Krasan.

New York.—Boulevard Auto Co., capital stock $20,000, to manufacture motors, engines, motor cars, etc.. Incorporators, E. N. Sorgenfrei, W. Peters and A. Korsmeier.

Gloversville, N. Y.—Timetest Supply Co., capital stock $100,000, to supply timetests to motor car owners, deal in supplies, etc. Incorporators, J. H. Stockamore, T. Robinson and D. D. Lake of Gloversville.

New York.—Triplex Engineering Corporation, capital stock $25,000, to manufacture and repair motors, engines, machinery, etc.; mechanical and electrical apparatus and fixtures. Incorporators, C. Bechtold, E. H. Bechtold.

New York.—Interstate Motoring Association, capital stock $50,000, to deal in motor cars, motor boats, supplies and accessories, build and operate garages; incorporators, T. W. Rollins, M. Turner and H. O. Carriere.

Elizabeth, N. J.—Sterling Garage and Automobile Co., capital stock $5,000, to deal in motor cars, etc. Incorporators, William J. Cullen, John D. Moore and William E. Morgan.

Camden, N. J.—Chester Automobile Tire Co., capital stock $500,000, to manufacture tires and wheels for motor cars, bicycles, carriages, etc. Incorporators, Joseph S. Swain, George M. Bryson and Wynn Armstrong.

Urbana, Ill.—A new garage is under construction for the Illinois Motor Sales Co..

Spokane, Wash.—The Empire Auto Repair Co. will ereect a modern garage 50 by 100 at Second avenue near Cedar street.

Waukesha, Wis.—Frederick Ahrens, superintendent of the Waukesha Motor Co., has resigned. He has made no plans for the future.

Scranton, Pa.—The Philadelphia Construction Co. has opened a garage at 227 and 229 Raymond court and will handle the Velie.

Ralston, Neb.—Construction is under way for the buildings of the Rogers Motor Car Co. The company expects to begin the manufacture of its cars by May 1.

Washington, D. C.—The Bennett-Collins Co. has leased the building at Fourteenth and S streets, and will carry a line of supplies, in addition to the Staver-Chicago.

Washington, D. C.—The Selby Co., consisting of Ernest Selby and Roy M. Palmer, has been formed to handle the Paige-Detroit. The company has leased the building at Fourteenth and S streets, N. W.

Baltimore, Md.—The Auto Trading and Garage Co. has been organized with Philip Wenchel, president; Jacob Baumann, vice-president; W. Howard Schweizer, general manager, and F. W. Lilly, treasurer. The company has leased the building at North avenue and Oak street. This will be the local branch for the Washington car, manufactured by the Carter Motor Car Co. of Hyattsville, Md.

Brief Business

Buffalo, N. Y.—The Maxwell-Briscoe Buffalo Co. will build a three-story brick show room.

New Philadelphia, O.—Edward Goodwin is remodeling the skating rink into a garage which will be opened about April 1.

Massillon, O.—The English Motor Car Co. has purchased the Loeffler block on South Erie street which will be remodeled into a garage.

Philadelphia, Pa.—Spencer & Dando, who recently secured the Philadelphia sales rights for the Thermoid-Lafleur tire, have opened salesrooms at 1409-11 Vine street.

Pana, Ill.—The firm of Broehl & Galvin has dissolved, Mr. Galvin retiring. Mr. Broehl has taken his sons into the business and the firm will be known as the Pana Motor Car Co.

Boise, Idaho—The Intermountain Automobile Co., which has the Franklin agency, has reincorporated and increased its capital stock, in order to keep pace with its growing business.

Woodville, O.—The Woodville Garage Co. has been incorporated with a capital of $10,000 by Fred H. Hartman, W. H. Price, Charles A. Kuhlman, William Uschel and J. T. Smith.

Cleveland, O.—The Kurtzer Radiator Co. has been incorporated with a capital stock of $10,000 to manufacture radiators and other accessories by Hugo P. Kurtzer, F. N. Dunsford, G. M. Phillips, L. D. Litzler and William F. Kees.

Coshocton, O.—The Vickers Auto Car Co. has completed its first car which will be called the Vickers. Carl Vickers, proprietor of the Vickers Repair Shop, backed by E. H. McMasters, of Bellaire, O., is at the head of the company. The demonstrator is a two-seated runabout with a four-cylinder two-cycle air-cooled engine.

Brodhead, Wis.—H. W. Wilcox of Chicago is here to promote the establishment of a center of operations for the Overland Transfer Co., manufacturing and operating heavy commercial cars for use in the mining districts. Brodhead is near the great Wisconsin lead and zinc mining district, which ranks second only to the Joplin, Mo., fields.

Toledo, O.—Papers have been prepared for the incorporation of the Parcel Delivery Van Mfg. Co. The concern will have a capital stock of $50,000. While the charter will be broad enough to admit of the making of most any kind of vehicle, the company will start in by manufacturing a three-wheeled motor tricycle delivery van. The incorporators are W. S. Thurstin, G. E. Seney, F. M. Smith, Amos Conn and R. D. Whittlesey, but it is understood outside capital is backing the project.

Hartford, Conn.—C. K. Hansen has moved to his new garage, 258 Main street.

Philadelphia, Pa.—The Kittanning Automobile Co. of Kittanning has been incorporated. Capital, $5,000.

Athens, O.—The Athens Automobile Co. has been incorporated with a capital of $10,000 by A. T. Lawhead and others.

Grand Rapids, Wis.—The Metzger Wagon Works plant is being remodeled into a garage and repair shop for Sam Rowson.

Glenwood, Ia.—Clyde Stranahan and Charles Doles have bought the business and garage of Utterbach & Lee, of Glenwood, Ia.

Akron, O.—The Portage Motor Car Co. has been incorporated with a capital stock of $5,000 to operate a garage by Albert Buehrle and others.

Circleville, O.—The Spangler Automobile Co. will soon open a garage on North Court street. The building will cover a half lot and will be two stories high.

Omaha, Neb.—Plans have been completed for the new Ford branch in Omaha, which will be built at Twentieth and Karney streets. The Ford company will erect a $40,000 building.

Milwaukee, Wis.—Milwaukee motor car men, whose names are not yet made public, have arranged to operate a motor livery service between Ripon, Wis., and Green Lake and the Oakwood hotel on Green lake. According to Ripon men, a twenty-passenger truck has been purchased.

Buffalo, N. Y.—The Chisholm Sales Co., which will deal in motor cars, motor boats and accessories, has been incorporated. The capital is to be $30,000 and the company will begin business with $10,000. The directors are George H. Chisholm, Harry L. Chisholm, Francis F. Baker and Elizabeth M. Nauth.

Long Island City, L. I.—The John Galvin factory on East street near Mott avenue is nearing completion. The Palmer & Singer factory on Second avenue is nearly ready for occupancy, while the big Brewster factory on the Queensboro Bridge plaza and the Packard factory on Thompson avenue are about half completed.

Omaha, Neb.—The garage of the Fredrickson Automobile Co. at 2046-48 Farnam street, which was recently refurnished and remodeled, was badly damaged by fire last Saturday morning. The origin of the fire is unknown. Thirty cars were in the garage at the time and ten of these were safely run out of the building. The other twenty were a total loss. The loss on the

Announcements

building is estimated at about $10,000 and the loss on the cars at about $40,000.

Monroe, Wis.—Douglas Brown will embark in the motor livery and agency business.

Laramie, Wyo.—The Lovejoy Novelty Co. has added a second story to its building and has increased its stock.

Huntington, N. Y.—The North Shore Garage Co. is building a concrete garage 50 by 20 without inside posts on New York avenue.

Fort Worth, Texas—The Imperial Garage and Sales Co. has been incorporated and backed by prominent Dallas business men. The capital is $10,000.

Racine, Wis.—James Cape, fire marshal, is now the possessor of a special car, a gift to the city of Racine from Captain William Mitchell Lewis, president and general manager of the Mitchell-Lewis Motor Co.

Baltimore, Md.—The Foss-Hughes Motor Co., Howard street near Centre, agent for the Pierce-Arrow, will move into its new home at 812 North Charles street, May 1. The new building is just being completed. H. J. Sturdevant is the local manager.

Houston, Texas—H. House is erecting a garage at Capital avenue and Milam street which is nearing completion. E. E. Guthrie and G. E. Coton are overhauling the building at San Jacinto street and Prairie avenue, and L. H. Burks & Son expect to move back into their old quarters opposite the Bristol hotel.

Sheridan, Wyo.—The Buffalo-Sheridan Stage and Automobile Co. is planning to build a new headquarters and garage to cost about $6,000 on North Gould near Dow street. The building will be 50 by 115, will be built of brick and will be one story high. The stockholders in the company are Dr. H. O. Cox, Jesse Newton, Bert Woodside and Dr. C. E. Stevenson.

Harrisburg, Pa.—April 11 to 16 inclusive is set aside for the show of Harrisburg dealers in Kelker Street hall, where twenty-two makes of cars will be represented. The Harrisburg Automobile Association has been formed, with officers: I. W. Dill, president; George G. McFarland, first vice-president; Andrew Redmond, secretary; Earl W. Cox, treasurer, C. C. Crispen.

Buffalo, N. Y.—The Electrolytic Products Co. has been incorporated in Buffalo. Attorney Frank A. Abbott is secretary and treasurer and a director of the new concern, which will manufacture motor cars, radiators by electricity. It is reported that the concern will erect a large plant near the northern city line, Buffalo, and the construction work will be started as soon as an available site is offered. The capital stock of the company is $100,000 and the directors are F. A. Abbott, Henry C. Steul and Joseph Porzel.

Omaha, Neb.—The Kemper Automobile Co. is a new concern in Omaha which will handle the Everitt and the Winton.

Cincinnati, O.—The Western Sales Agency Co. has been incorporated with a capital of $5,000 by Max S. Goldsmith and others.

Boston, Mass.—J. H. Cooper, manager of the Ajax Tire Co., Boston branch, for some years, has resigned. He is going into the mercantile business.

Urbana, O.—Work on the new Stevens garage to be installed in the Mosgrove block is progressing rapidly and will be ready for occupancy May 1.

Grove City, Pa.—The Hercules Specialty Co. is arranging to manufacture motor trucks. James McIntosh, a mechanical expert, has been engaged to manage the new plant.

Beloit, Wis.—The Fairbanks-Morse Mfg. Co., one of the largest builders of gasoline engines in the northwest, has built for experimentation and demonstration a motor plow of 25 horsepower.

Fresno, Cal.—The Dorris garage now building at K and Merced streets when completed will be the fourth new garage within the past few months in Fresno county.

Seymour, Wis.—William Michelstetter is authority for the statement that a motor transfer line will be established between Seymour and Appleton, Wis., before the beginning of summer.

Milwaukee, Wis.—F. A. Bowers, for the last 10 years master mechanic and designer of pressed steel stamping tools for the A. O. Smith Co. has severed his connection with that concern. His plans for the future are indefinite.

Janesville, Wis.—The Willard-Harlow Mfg. Co. has elected these officers: President, R. Willard; vice-president, P. H. Korst; secretary, J. C. Harlow; treasurer, O. W. Athon. The company will manufacture spark plugs, meters, tops, canopies, awnings and other specialties.

Millersville, O.—The Millersville Machine Co. is erecting a new plant, just east of the old factory which will be used to manufacture motor cars. Recently a 25-horsepower runabout has been placed on the market. New machinery is to be added to the present equipment.

Buffalo, N. Y.—The Willet Engine and Carbureter Co., which will engage in the manufacture of the Willet two-cycle gasoline engine for motor cars and other purposes, will increase its capital stock to $1,000,000. The company announce that they will give special attention to the manufacture of commercial vehicles, specializing the 1,000 pound delivery wagons at a cost not exceeding $1,400.

New Brunswick, N. J.—Williamson Garage Co. has been organized by Walter Williamson, Norman H. Smith & J. Bursell Buckelew. It will take over the Potter garage in Albany street.

Cheyenne, Wyo.—F. R. Dildine has bought the business of Smith & Armstrong. The building occupied will be remodeled and refurnished. The Studebaker and E-M-F cars are handled by Mr. Dildine.

Washington, D. C.—The Firestone-Columbus and the Stanley steamer will be handled by the Columbia Sales Agencies, of which Elbert S. Maloney is manager. The company is located at 1042 Wisconsin avenue, N. W.

Milwaukee, Wis.—The Milwaukee agency for the E-M-F and Flanders has been turned over to Studebaker Automobile Co. and again is housed in the Studebaker salesrooms, in the Colby-Abbot building. William F. Sanger, representative of the two cars, will be connected with the agency, which is under the management of C. R. Dashiell.

Appleton, Wis.—The Eagle Mfg. Co. has abandoned its plan of starting the manufacture of pleasure vehicles under its scheme of reorganization and expansion, but instead will produce gasoline engines for plowing purposes. These gasoline tractors will be built in four power sizes, as follows: 20 and 25 horsepower in two-cylinders; 35 and 50 horsepower in four-cylinders.

Agencies Appointments

Elizabeth, N. J.—Hiram L. Fink, Elmore.
Portland, Ore.—Van Matre-Landy Auto Co., Baker electric.
Portland, Ore.—Metropolitan Motor Car Co., Lozier.
Portland, Ore.—Ed Hollenbeck, Lane.
Janesville, Wis.—Park Hotel Garage, Cadillac.
Janesville, Wis.—Baack, Reed & Gage Co., Kisselkar, E-M-F, Maxwell, Stoddard-Dayton, Matheson and Flanders.
Janesville, Wis.—Sykes & Davis, Overland.
Janesville, Wis.—Ford, Blodgett & Holmes, Ford.
Merrill, Wis.—Merrill Iron Works, Overland.
Brillion, Wis.—Calumet Auto Co., Overland.
Baraboo, Wis.—Gallman's Garage, E-M-F, Flanders.
Baraboo, Wis.—L. P. Helm, Overland.
Sheboygan, Wis.—Wilke Garage, Reo.
Wausau, Wis.—T. H. Jacobs, Overland.
Lowell, Wis.—W. T. Schwartz, Badger.
Fox Lake, Wis.—Cochrane & Son, Jackson, Fuller.
Mayville, Wis.—Mayville Auto Co., Ford.
Watertown, Wis. — Tuschen Brothers, White, Waverley and Halladay.
Omaha, Neb.—Standard Automobile Co., Regal.
Lincoln, Neb.—J. J. Brown Auto Co., Parry and American Traveler.
Sioux City, Ia.—Adams & McCluskey, Lambert.
Des Moines, Ia.—H. W. and W. C. Bovee, Velie.
Des Moines, Ia.—Bernhard & Turner Automobile Co., Columbus electric.
Des Moines, Ia.—Brown-Williams Motor Car Co., Warren-Detroit.
Des Moines, Ia.—Patton-Van Vliet Co., Abbott-Detroit.
Des Moines, Ia.—Dukeheart Machinery Co., Everitt.
Des Moines, Ia.—J. C. Heath, Pope-Hartford and Franklin.
Philadelphia, Pa. — Taylor Distributing Agency, Matheson.
Philadelphia, Pa.—Warren-Detroit Motor Car Co. of Pennsylvania, Warren-Detroit.

COPPER-ALUMINUM ALLOYS WITH MANGANESE

PART IV

EDITOR'S NOTE—The following is the fourth installment of the ninth report of the alloys research committee of the Institute of Mechanical Engineers of Great Britain, which report was presented in full during the session, January, 1910. The authors of this report are Dr. W. Rosenhain and F. C. H. A. Lantsberry, of the National Physical Laboratory, Tellington, Eng.

TORSION tests on nine different alloys were carried out on all the nine alloys in the form of bars rolled hot to 1¼-inch diameter. The results of these tests are given in table 12 and are represented graphically in Fig. 16. Owing to the similarity in the behaviour of all the alloys under this test it would be impossible to draw the torsion diagrams of the whole series on one figure without undue overlapping of the curves; this has been avoided by displacing the zero of each successive curve by a constant amount towards the right of the diagram, but this displacement must be taken into account when reading the diagram.

From the table and diagrams it will be seen that alloy No. 9 of series is considerably the best as regards torsion, since it yields both the highest ultimate strength and the greatest angle of twist. This combination is certainly remarkable, since in most groups of alloys the angle of twist diminishes rapidly as the maximum strength increases. The case in point is another example of the striking manner in which some of the alloys of the present series combine qualities of strength and ductility not usually associated in the same substance. Alloy No. 3 also gives very good results in torsion, giving 31.86 tons maximum strength and a total angle twist of 272 degrees.

The influence of the presence of manganese on the torsional properties of these alloys is still more clearly brought out in table 13, where the comparison of the maximum stresses found in tension and torsion tests respectively is tabulated. It will be seen that in the present series the ratio of the maximum stresses is in all cases less than unity, and only in the later members of the series approaches unity. Inspection of the table at once brings out the fact that the presence of manganese tends to reduce the ratio in question, but if the attempt is made to express this influence quantitatively no very definite result is obtained. The influence of increasing aluminum on this ratio can be readily plotted, and a reasonably uniform curve can be drawn, but if the effect of manganese in depressing the ratio below the value obtained from this curve for any given aluminum content be calculated it is found that the depression is practically independent of the quantity of manganese present only varying from 0.11 to 0.14, while the manganese varies from about one-half to 5 per cent. This result may not perhaps possess much real physical significance, but it rather suggests that the ratio of ultimate tensile to ultimate torsional strength does not constitute so good a guide to the physical behavior of the materials as has been suggested. Even from that point of view, however, the fact that the ratio of torsional to tensile strength is less than unity in all the present alloys must be regarded as a favorable result.

TABLE 12
Torsion Tests on Nine Selected Alloys

No.	Composition Al.	Mn.	Diameter In.	Length In.	Twisting Moment In.-lb.	Maximum Load Total Twist: Calculated Maximum Stress Tons sq. in.	Number of Turns	Angle of Twist Degrees.
1	10.03	0.43	0.624	3	3,226	30.24	0.55	200
2	10.02	0.92	"	"	3,136	29.30	0.56	202.5
3	9.82	1.88	"	"	3,405	31.86	0.76	272.5
4	9.16	0.93	"	"	3,136	29.30	0.85	307.2
5	9.06	1.95	"	"	3,405	31.80	0.98	352.5
6	8.91	2.98	"	"	3,405	31.80	0.93	334
7	9.33	3.78	"	"	3,226	30.24	0.71	254
8	8.02	3.94	"	"	3,405	31.80	1.41	507
9	7.92	4.92	"	"	3,494	32.62	1.53	551.4

TABLE 13
Comparison of Maximum Stresses Found in Torsion and in Tension for Nine Selected Alloys

No.	Composition Al.	Mn.	Maximum Stress in Tons per square inch Tension	Torsion	Ratio—Torsion, Tension
1	10.03	0.43	40.28	30.24	0.75
2	10.02	0.92	38.08	29.30	0.77
3	9.82	1.88	40.40	31.80	0.79
4	9.16	0.93	36.28	29.30	0.81
5	9.06	1.85	37.12	31.80	0.85
6	8.91	2.98	38.64	31.80	0.82
7	9.33	3.78	38.12	30.24	0.82
8	8.92	3.94	35.60	31.80	0.89
9	7.92	4.92	36.24	32.26	0.90

TABLE 14
Alternations Endured

No.	First Test	Second Test	Mean of two	Mean of four
1—a	1,182	1,086	1,109	....
b	708	582	645	877
2—a	1,250	1,232	1,241	....
b	904	1,030	967	1,104
3—a	900	760	830	....
b	1,146	926	1,036	933
4—a	772	738	755	....
b	728	724	726	741
5—a	828	698	763	....
b	850	776	813	738
6—a	682	678	680	....
b	776	586	681	680
7—a	848	670	759	....
b	698	562	630	694
8—a	456	422	439	....
b	456	432	444	441
9—a	416	412	414	....
b	398	466	432	423
10—a	206	160	183	....
b	180	180	180	181

Professor Arnold remarks that: "The above tests were made under my standard conditions, viz., diameter of test-bar, ⅜-inch; rate of alternations, 650 per minute; distance between zero of stress—striking line on radius of plunger—and plane of maximum stress—face of die—3 inches; deflection at zero of stress ⅜-inch each side, at maximum stress just beyond elastic limit."

Dynamic Tests on Nine Alloys

In the earlier stages of the present research it was the intention of the authors to carry out the investigation of all nine of these alloys to the fullest available extent, and samples of these alloys were therefore sent to Professor J. O. Arnold at Sheffield university for the purpose of being tested in the alternating stress machine of the metallurgical department at that university. These tests were carried out by Professor Arnoid. The specimens consisted of round bars turned from the 13/16-inch diameter rolled bars, two pieces approximately 6 inches long being sent from each bar, the two pieces being in every case cut from adjacent portions of the bar. Professor Arnold's results are given in full in table 14. It will be noticed that the results of individual tests vary somewhat widely, particularly in the case of alloys Nos. 1, 2 and 3 of the present series.

At first sight it would appear that the explanation of these variations in alternate bending tests lay in a lack of uniformity of the material, but this explanation cannot be adopted because it is found that the results of tests on closely-adjacent cross-sections differ more widely than those on portions of material which were many inches apart in the original

TABLE 15
Specific Gravity in Grammes per Cubic Centimeter

No.	Composition Al.	Mn.	Sand Cast	Chill Cast	Hot Rolled	Cold Drawn
1	10.03	0.43	7.62	7.55	7.54	...
2	10.02	0.92	7.53	7.51	7.52	7.56
3	9.82	1.88	7.62	7.51	7.53	7.52
4	9.16	0.93	7.64	7.55	7.61	...
5	9.06	1.85	7.57	7.63	7.60	...
6	8.91	2.98	7.57	7.57	7.59	7.59
7	9.33	3.78	7.52	7.63	7.56	...
8	8.02	3.94	7.64	7.73	7.67	...
9	7.92	4.92	7.65	7.76	7.63	7.60

TABLE 16
Specific Gravity in Pounds per Cubic Foot

No.	Composition Al.	Mn.	Sand Cast	Chill Cast	Hot Rolled	Cold Drawn
1	10.03	0.43	476	472	472	...
2	10.02	0.92	471	470	470	473
3	9.82	1.88	476	470	471	471
4	9.16	0.93	477	472	476	...
5	9.06	1.85	473	477	475	...
6	8.91	2.98	473	473	474	474
7	9.33	3.78	470	477	473	...
8	8.02	3.94	477	483	480	...
9	7.92	4.92	477	485	477	475

TABLE 18
Alloy No. 2. Aluminum 10.02 per cent, Manganese 0.99 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	14.00	35.76	22.5	...
Sand casting annealed at 550° C.—1,022° F.	12.72	28.30	15.0	...
Sand casting quenched at 550° C.	13.60	31.80	18.5	...
Sand casting annealed at 800° C.—1,472° F.	13.20	29.16	17.0	...
Sand casting quenched at 800° C.	13.04	41.28	6.0	...
Chill casting	16.00	39.90	25	...
1¼-inch rolled bars	17.12	38.08	26.5	32.4
13/16-inch rolled bars	23.04	42.84	22.5	33.6
13/16-inch rolled bars annealed at 550° C.	21.6	37.40	5.0	...
13/16-inch rolled bars quenched at 550° C.	20.4	39.4	16.0	...
13/16-inch rolled bars annealed at 800° C.	15.3	34.6	31.0	...
13/16-inch rolled bars quenched at 800° C.	24.2	45.5	11.5	...
13/16-inch cold-drawn bars	42.0	50.04	16.0	...

TABULATED RESULTS OF TENSILE TESTS OF ALLOYS RICH IN COPPER

TABLE 17
Alloy No. 1. Aluminum 10.03 per cent, Manganese 0.43 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	14.28	32.80	24	...
Chill casting	15.92	36.00	24	...
1¼-inch rolled bars	18.68	40.28	24.5	...
13/16-inch rolled bars	19.60	39.40	31	29.2
13/16-inch cold-drawn bars	42.04	46.20	13	18.8

TABLE 19
Alloy No. 3. Aluminnm 9.99 per cent, Manganese 2.01 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	13.2	34.44	24	...
Sand casting annealed at 550° C.—1,022° F.	11.00	32.15	15	...
Sand casting quenched at 550° C.	12.40	33.88	11	...
Sand casting annealed at 850° C.—1,472° F.	13.00	40.00	12	...
Sand casting quenched at 850° C.	18.00	41.08	5	...
Chill casting	16.80	37.00	25	...
1¼-inch rolled bars	18.20	40.40	35.0	31.3
13/16-inch rolled bars	21.40	40.72	29.0	32.0
13/16-inch rolled bars annealed at 550° C.	22.2	39.00	7.5	...
13/16-inch rolled bars quenched at 550° C.	19.1	42.00	25.0	...
13/16-inch rolled bars annealed at 850° C.	14.6	35.45	26.5	...
13/16-inch rolled bars quenched at 850° C.	25.2	52.00	3.5	...
13/16-inch cold-drawn bars	40.88	52.08	10.0	...

TABLE 20

Alloy No. 4. Aluminum 9.16 per cent, Manganese 0.93 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	11.20	30.68	46.50	...
Chill casting	13.00	33.92	46.00	...
1¼-inch rolled bars	16.28	36.28	45.00	46.0
13/16-inch rolled bars	21.24	38.24	41.50	54.0

TABLE 21

Alloy No. 5. Aluminum 9.06 per cent, Manganese 1.95 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	10.60	31.32	40.0	...
Chill casting	14.16	33.20	30.0	...
1¼-inch rolled bars	16.80	37.12	43.5	47.2
13/16-inch rolled bars	20.40	38.88	42.0	48.0
13/16-inch cold drawn bars	36.88	42.32	23.5	40.8

TABLE 22

Alloy No. 6. Aluminum 8.91 per cent Manganese 2.98 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	10.80	31.60	24	...
Sand casting annealed at 550° C.—1,022° F.	12.97	31.24	35	...
Sand casting quenched at 550° C.	14.40	31.80	31.5	...
Sand casting annealed at 900° C.—1,652° F.	10.40	27.04	49	...
Sand castiag quenched at 900° C.	17.20	39.38	9	...
Chill casting	14.80	34.40	26	...
1¼-inch rolled bars	18.04	38.64	43.5	46.0
13/16-inch rolled bars	20.00	40.00	39.0	43.6
13/16-inch rolled bars annealed at 550° C.	22.20	41.00	27.0	...
13/16-inch rolled bars quenched at 550° C.	20.30	31.20	39.0	...
13/16-inch rolled bars annealed at 900° C.	12.60	31.80	43.0	...
13/16-inch rolled bars quenched at 900° C.	19.90	43.70	23.0	...
13/16-inch cold drawn bars	38.92	44.00	22.0	40.0

TABLE 23

Alloy No. 7. Aluminum 9.33 per cent, Manganese 3.78 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	12.24	32.12	20.0	...
Chill casting	15.14	39.58	32.0	...
1¼-inch rolled bars	16.80	38.12	34.0	38.4
13/16-inch rolled bars	18.12	40.52	35.0	38.0
13/16-inch cold drawn bars	40.70	43.70	21.0	34.0

TABLE 24

Alloy No. 8. Aluminum 8.02 per cent, Manganese 3.94 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	11.40	28.80	31.5	...
Chill casting	13.20	33.04	50.0	...
1¼-inch rolled bars	16.32	35.60	49.0	56.0
13/16-inch rolled bars	18.72	37.44	45.0	54.0
13/16-inch cold-drawn bars	34.80	39.60	35.0	55.2

TABLE 25

Alloy No. 9. Aluminum 7.92 per cent, Manganese 4.92 per cent

Condition	Yield Point Tons per sq. in.	Ultimate Stress Tons per sq. in.	Elongation per cent on 2 inches	Reduction of area Per ct.
Sand casting	11.24	28.00	30.0	...
Chill casting	12.38	30.40	28.0	...
1¼-inch rolled bars	17.60	36.24	52.0	54.8
13/16-inch rolled bars	19.32	36.60	45.0	51.2
13/16-inch cold-drawn bars	34.80	41.20	30.0	49.2

bars. The high degree of uniformity of the results obtained with these materials in all other tests, dynamic as well as static, further supports this view.

A curious feature of these results is that the present series of alloys, arranged in the order of their serial numbers, are also arranged in the approximate order of decreasing resistance to Professor Arnold's test. The numerical order of the alloys is based approximately on their aluminum content, and, with the exception of No. 3, also in the order of increasing manganese content. It would therefore appear from these tests that the effect of increasing manganese is to reduce the resistance of the alloys to this form of test, but in the case of the alloys containing 10 per cent of aluminum this only makes itself felt very slightly; in fact, the actual resistance of No. 1, containing 10 per cent of aluminum and a little less than 0.5 per cent of manganese, is considerably better than the alloy containing 10 per cent of aluminum and no manganese, and this applies still more to No. 2. But in the case of pure aluminum-copper alloys the reduction of aluminum from 10 per cent to 7.5 per cent brings about a very marked increase in the power of enduring alternations on the Arnold machine; in the present series, on the other hand, the reduction of aluminum to 8 per cent is far more than counterbalanced by the presence of 5 per cent of manganese. From the point of view of these tests, therefore, it may be concluded that the presence of manganese in proportions up to 2 per cent is an advantage to the alloys with more than 9 per cent of aluminum, but that in the case of alloys of lower aluminum content the effect of the addition of manganese appears to be of the reverse nature.

These have been determined in the sand-cast, chill-cast, hot-rolled and cold-drawn conditions, and are given in table 15, where the figures represent the weight of a cubic centimeter of the alloys in grammes, while in table 16 the same results are expressed in terms of pounds per cubic foot.

In view of the large expenditure of time and labor involved in carrying out complete dynamic and other tests on all the nine selected alloys some of whose properties have been described in the preceding sections, and also on account of the fact that these alloys constitute a group of somewhat similar properties, the authors decided to confine the complete mechanical and thermal study which was originally contemplated to three alloys selected from among the nine in question. In making their choice of these three alloys the authors experienced some difficulty in arriving at a decision as to which members of the group would afford the most interesting results. In making their final decision the authors were led by the idea that those alloys which appeared to present, from their tensile tests, the greatest combination of tenacity with ductility would be those of greatest value and interest. Alloys Nos. 2, 3 and 6 were accordingly chosen.

These three alloys were subjected to the following additional tests:

1—Determination of the elastic modulus and limit of elasticity by means of the extensometer.

2—Determination of the stress-strain diagram by an autographic apparatus attached to 8-inch specimens.

3—Determination of the effect of cold-drawing on the elastic modulus and the limit of elasticity.

4—Tensile tests at high temperatures—up to 450° C.

5—Series of dynamic tests, including—
- a Resistance to alternating stress.
- b Resistance to repeated bending-impact.
- c The Izod test.
- d Resistance to abrasion.

These tests were carried out by Dr. T. E. Stanton on the special machines for these purposes in the engineering department of the laboratory.

6—Effect of heat treatment on the tensile properties of sand castings and rolled bars.

7—Fresh- and sea-water corrosion tests.

1—Determination of the elastic modulus and limit of elasticity. These tests were carried out on turned specimens, 0.5 inch in diameter and with a parallel portion allowing of 8 inches between gauge-marks. The extensions of the specimens were read with a Ewing extensometer and readings were taken for every 0.1 ton of actual load. The resulting elastic curves are plotted in Fig. 17. It will be seen from these curves that the departure from elastic behavior is very gradual as the limit of proportionality of extension to load is passed, yet this limit is very well defined. The elastic limits and elastic moduli of the three alloys in question are shown in next part.

(To be continued.)

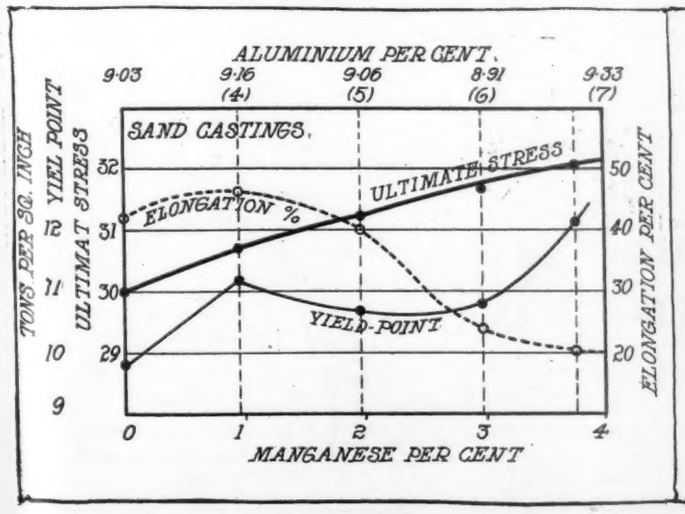


FIG. 14

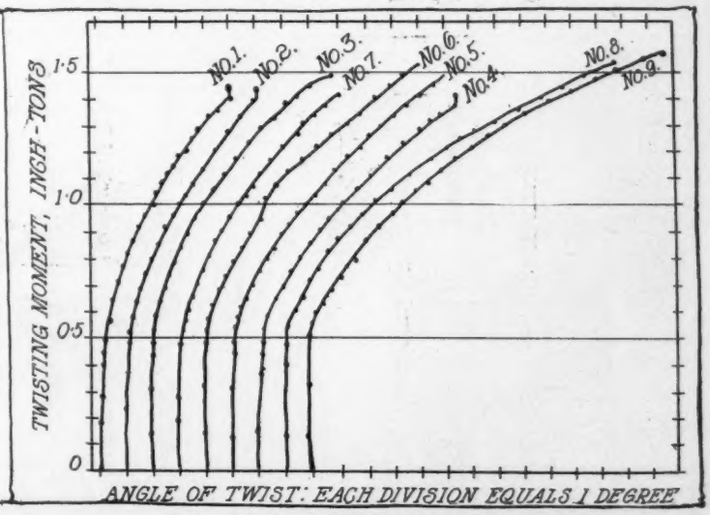


FIG. 16

Current Motor Car Patents

Carbureter Without Float—No. 952,547, dated March 22; to Josef Schwartz, Bay City, Mich.—The carbureter to which this patent relates, is shown in Fig. 3, and its advantages are its simplicity and the absence of a float-feed mechanism. The gasoline enters the carbureter at the point A, the feed being regulated by the needle-valve N, which admits the fuel to the spraying-nozzle Z. When the motor is in operation and a vacuum is produced in the mixing-chamber M, the air inlet-valve V, is automatically drawn upward, and air is sucked in through the opening C; and as the valve V is raised, the needle stem L, which extends directly upward from the center of the upper side of the valve head, lifts the ball-valve in the spraying nozzle and allows the gasoline to enter the mixing chamber, where it is vaporized and drawn with the inrushing air into the inlet pipe of the motor through the opening E. An adjustable bushing B is fitted into the spraying-nozzle to regulate or limit the movement of the ball.

Flexible Rear Axle—No. 952,457, dated March 22; to Frederick R. Martin and Oswald M. Shepherd, London, Eng.—The motor vehicle to which this patent relates is unique in that it has both a dead and a live axle at the steering end of the car; and the motor is flexibly attached to the frame of the chassis. With this construction, four-wheel drive and four-wheel steering is possible. An end view of the chassis is shown in Fig. 1. The frame F is supported through springs of a conventional type, on the solid or dead axle G, which rests on the wheels through pivotal steering knuckles at either end. The live axle is rigidly attached directly to the frame of the car through the bracket K, and consists of a driving and compensating mechanism securely held between the forks of the bracket K, and

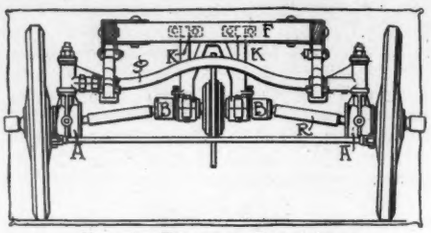


FIG. 1—FLEXIBLE REAR AXLE

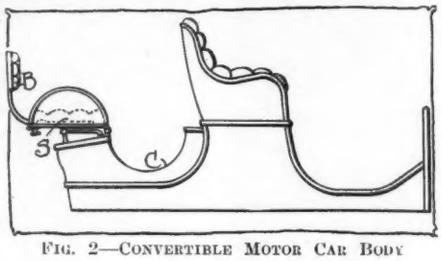


FIG. 2—CONVERTIBLE MOTOR CAR BODY

flexible shaft-connections to the wheels. As illustrated, the power from the motor, after passing through the change gear mechanism, is transmitted by chain to the large gear in the center of the driving axle, then to the wheels through the drive shafts R, which have universal joints A and B, at both ends.

Converting Cylinder Into Pump—No. 952,799, dated March 22; to Louis Galli, New York, N. Y.—This patent covers a means of temporarily changing one of the cylinders of a motor having a plurality of cylinders into an air pump to supply compressed air for use about the car or otherwise. This means, as illustrated in Fig. 5, consists of a device which screws in one of the cylinder plugs, and a method of hinging the adjustable portions of the push-rods so that they may be turned out of engagement with the ends of the valve-stems, rendering the inlet and exhaust valves of said cylinder inoperative. The device in the cylinder plug has a shut-off valve C, a ball-check air-inlet valve E, and a compressed air outlet valve F, which is also of the ball-check type. In operation, air is drawn in at D, on every down stroke of the piston P, and forced out at F on every up stroke; both push-rods being arranged as that shown at A.

Friction and Positive Clutch—No. 952,535, dated March 22; to Allen Loomis, Detroit, Mich.—This patent relates to a clutch mechanism which as shown in Fig. 4, comprises: a driving shaft to which the flywheel L is rigidly secured; a clutch-casing D bolted to said flywheel; a hub A loosely mounted upon the other shaft, two series of interleaved friction disks, one series being interlocked with the casing D and the other with the hub; a member E sliding upon said hub and adapted both to close the casing and to clamp the friction disks; and a positive clutch-member F mounted on the driven shaft and adapted to engage the friction-clutch member E.

Convertible Motor Car Body—No. 952,575, dated March 22; to Ransom E. Olds, Lansing, Mich.—This patent relates to a regular two-seated runabout body, with a rear deck having a portion of it convertible into a rumble seat, as illustrated in Fig. 2. The rear deck of this body is formed with a hinged seat section S, comprising an intermediate portion of the top and portions of the sides adjacent to the ends of the intermediate portion. A supporting rail is provided on the back end of the top of the deck, the standards of which have spherical enlargements which register with cup-shaped bearings in the seat section. To convert the car into a regular two-seater, one has but to fold the back rest B forward onto the seat portion, then the seat portion forward closing the rear deck, the sides of the seat portion filling the recesses C in the sides of the deck, completely closing the deck.

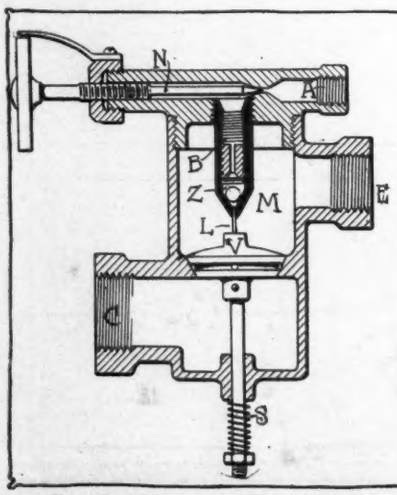


FIG. 3—CARBURETER WITHOUT FLOAT

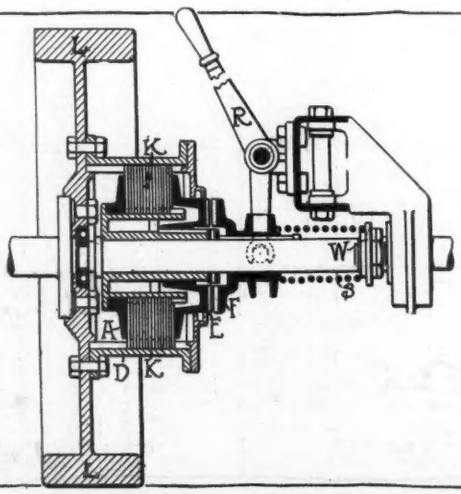


FIG. 4—FRICTION AND POSITIVE CLUTCH

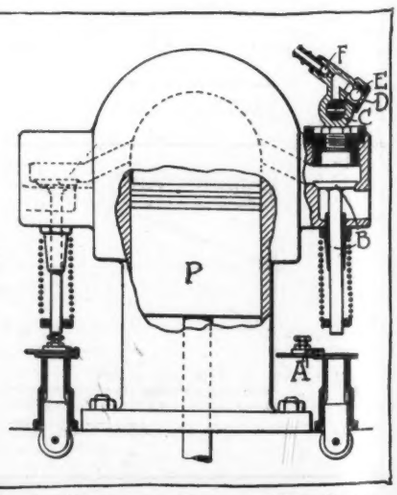


FIG. 5—CONVERTING CYLINDER INTO PUMP